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Analysis of the Management Situation and Subbasin Review

Andrews Management Unit/Steens Mountain Cooperative Management and Protection Area Resource Management Plan and Environmental Impact Statement

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
BURNS DISTRICT

ANALYSIS OF THE MANAGEMENT SITUATION AND SUBBASIN REVIEW

ANDREWS MANAGEMENT UNIT/STEENS MOUNTAIN COOPERATIVE MANAGEMENT AND PROTECTION AREA RESOURCE MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Prepared by the
Bureau of Land Management
Burns District Office
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1 INTRODUCTION

The Burns District Office (Burns DO) of the Bureau of Land Management (BLM) has initiated the preparation of a Resource Management Plan (RMP) for the Planning Area. Figure 1.1 shows the Planning Area boundary relative to other geographic features. The Planning Area encompasses the entire Andrews Resource Area (RA) and the portion of the Three Rivers RA within the Steens Mountain Cooperative Management and Protection Area (Steens Mountain CMPA). The Steens Mountain CMPA is the area identified in the Steens Mountain Cooperative Management and Protection Act of 2000 (Act) and is described below. The Planning Area outside of the Steens Mountain CMPA is identified as the Andrews Management Unit (Andrews MU). As a part of the RMP preparation process, the BLM has prepared this Analysis of the Management Situation (AMS) and subbasin review. In addition, an Environmental Impact Statement (EIS) must be prepared to analyze the alternatives posed in the RMP as required by the National Environmental Policy Act (NEPA). The overall objective of the RMP planning effort is to provide a collaborative planning approach to assist the BLM in updating existing management decisions and resource allocations by addressing new data, changing resource conditions, and changes in public land use that have occurred since the Andrews Management Framework Plan (MFP) was completed in 1982.

On October 30, 2000, the Act was signed into law. The Act designated 425,550 of BLM managed acres as the Steens Mountain CMPA, which includes 53,427 acres in the Three Rivers RA and the approximately 170,000 acre Steens Mountain Wilderness Area of which 97,671 acres were designated as a No Livestock Grazing Area. In addition, the Act also designated three new Wild and Scenic Rivers (WSRs) and expanded the existing WSR. The Act also designated a 900,000 acre Mineral Withdrawal Area, which encompasses the entire Steens Mountain CMPA and a portion of the Andrews MU, as well as portions of the Malheur RA (BLM Vale District) and the Three Rivers RA. The Act also created the Redband Trout Reserve (RTR), the Wildlands Juniper Management Area (WJMA) and the Steens Mountain Advisory Council (SMAC).

In 1995, preparation of the Southeastern Oregon Resource Management Plan (SEORMP) was initiated by the BLM Vale and Burns DOs. The SEORMP initially included the Andrews RA. As a result of the Act, however, the Burns DO determined it was appropriate to separate the Andrews RA from the SEORMP and develop a separate RMP for the Planning Area in order to address changes in land management resulting from directives of the Act.

1.1 Description of the Analysis of Management Situation and Subbasin Review

The AMS is a crucial step in the BLM's land use planning process, which guides the preparation of a RMP/EIS. The AMS assesses the condition of the various resources on public lands as well as the current management situation, the physical and biological characteristics, and the capability of the resources. The current management plans for the Planning Area are outlined in Chapter 3.

The subbasin review originated with the Interior Columbia Basin Ecosystem Management Plan (ICBEMP) that was established in 1994 to develop and then adopt a scientifically sound, ecosystem based strategy for managing all U.S. Forest Service (USFS) or BLM administered lands within the interior Columbia Basin. The ICBEMP covers an area of 145 million acres, 53 percent of which is federal land managed by the BLM or the USFS. The size of this area required a strategy to bring findings and information down to a level where they could be applied in a USFS or BLM management unit such as a ranger district or resource area. The subbasin review process was developed whereby pertinent information could be "stepped down" to the local management level. In this document the subbasin review covers the Planning Area.

The ICBEMP area was divided for analysis and review purposes into four geographic scales: broad-scale (interior Columbia Basin), mid-scale (subbasins or groups of subbasins), fine-scale (watershed), and site scale (project). The mid-scale or subbasin level is the level at which field offices would undertake long range planning for all resources within their respective administrative boundaries. The subbasins are based on the United States Geological Survey (USGS) 4th field hydrologic unit codes (HUCs). On average, these 4th field HUCs comprise an area of 500,000 to 1,000,000 acres. The Planning Area subbasin review area includes six subbasins identified in the ICBEMP scientific assessment: Guano, Harney/Malheur Lakes, Alvord Lake, Donner und Blitzen, Thousand-Virgin, and Crooked-Rattlesnake, comprising an area of approximately 2,177,810 acres. Land ownership and administrative responsibilities include private (including county) land, State of Oregon lands, BLM

Table 1.1: Land Ownership and Administration in the Planning Area

Land Ownership/Administration	Acres
BLM	1,649,467
USFWS	26,677
State of Oregon	7,647
Private (includes county land)	494,019
TOTAL	**2,177,810**

administered lands, and United States Fish and Wildlife Service (USFWS) managed lands. The majority of the land in the subbasin review area is administered by the BLM, Burns DO. Table 1.1 defines land ownership and administration in the Planning Area. All acreage numbers utilized in this document were derived utilizing Geographic Information System (GIS) technology and are not considered legal acreage numbers.

The subbasin review (Chapter 6) is an intergovernmental process in which mid- and fine-scale information is tiered to ICBEMP goals, objectives, and standards. It is a mid-scale look at ecosystem processes and functions. The review is designed to bridge the gap between the region-wide, broad-scale information derived from ICBEMP and the actual on-the-ground management actions. Subbasin review is a review of mid-scale issues to identify and set priorities for doing more detailed mid- and fine-scaled analysis. It is not a decision-making process, but rather a stage-setting process. Outcomes from the review do not constitute a stand-alone planning process; rather, the review is an integrated effort that supports other existing planning and assessment processes, thus leading to the decision to incorporate the subbasin review into the AMS.

Four areas are addressed in this combined AMS/subbasin review: 1) the subbasin review area, 2) the Planning Area, 3) the Steens Mountain CMPA, and 4) the Andrews MU. The RMP will address management decisions relative to BLM administered lands in the Planning Area.

1.2 Analysis of the Management Situation and Subbasin Review Process

During the resource management planning process, the BLM will set priorities for acting on recommendations and opportunities. Emphasis will be placed on opportunities for protecting and managing special areas such as Areas of Critical Environmental Concern (ACECs); opportunities for management of resources across administrative boundaries such as watersheds, aquatic species, and noxious weeds; and opportunities for control of juniper expansion.

BLM staff incorporated the descriptions of the mid-scale character and the recommendations into the Resource Area Profile (RAP), Chapter 2, and Management Opportunities, Chapter 4, of the AMS, respectively. The similarities between the subbasin review process and the AMS process are shown in the Table 1.2.

1.3 Organization of Document

The Introduction, Chapter 1, is followed by the RAP (Subbasin Characterization), Chapter 2, which describes the current characteristics of the Planning Area. Chapter 3 describes the Existing Management Situation within the Planning Area and outlines the current management direction provided in the Andrews MFP, the Act, the Interim Management Policy (IMP) for the Steens Mountain CMPA, and other documented management decisions. In addition, BLM/federal management directives, activity-level plans and other guidance documents are listed in this chapter. Chapter 4 is Management Opportunities (Recommendations and Integrated Priorities), which identifies the management opportunities and develops recommendations. Identification of potential management opportunities is step five in developing the AMS. Development of recommendations and determination of integrated priorities serve as step four of the subbasin review process. Legal Mandates, Planning Criteria, and Proposed Alternatives are described in Chapter 5. This chapter outlines the mandates to which the RMP/EIS must adhere, and discusses the Planning Criteria which

Table 1.2: Steps in the Subbasin Review and Analysis of Management Situation

Subbasin Review		Analysis of the Management Situation	
Step		**Step**	
1.	Prepare for the Review	1.	Collect and Consolidate Data
2.	Identify Mid-scale Issues	2.	Conduct Internal and Public Scoping
3.	Describe Mid-scale Character (Describe character of the review area in relationship to the issues)	3.	Resource Area Profile (Describe the condition of the resource area, including its physical, biological and human environment)
	No step in subbasin review corresponds to Existing Management Situation of the AMS	4.	Existing Management Situation (Describe for each resource its current uses, production, or protection problems and the management practices and direction)
4.	Develop recommendations and integrated priority setting. (Develop recommended actions and determine urgency and timing of actions)	5.	Identify Management Opportunities (Identify and evaluate all reasonable opportunities and/or actions to address the planning issues and management concerns)
5.	Subbasin Review Report (Document the subbasin review results and the process. Provide information for further planning)	6.	Prepare the AMS (Develop a comprehensive document for use by the BLM and a summary document for public distribution. Provide information for RMP/EIS)

will guide the preparation of the RMP/EIS. In addition, it describes the preliminary alternatives that have been developed in the planning process. Chapter 6 is the Subbasin Review Report, which outlines the mid-scale issues identified by the BLM as well as the broad-scale issues identified during the ICBEMP process, and presents the determination on the applicability of these issues to the Planning Area. Chapters 7 through 11 consist of the List of Preparers, the Planning Process, the Abbreviations and Acronyms, the Glossary, and the References.

This document includes three sections which will feed directly into the RMP/EIS. First, the RAP, which describes the existing physical, biological, and human environment of the Planning Area and equates to the Affected Environment section of the RMP/EIS. Second, the Existing Management Situation which describes (for each resource) the current uses, production or protection problems, and managerial practices and direction from previous planning documents, leading to the No Action Alternative of the RMP/EIS. The third section is the Management Opportunities section, which identifies and evaluates all reasonable opportunities to address the planning issues and management concerns, and is the basis for developing alternatives for the RMP/EIS.

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2 RESOURCE AREA PROFILE (SUBBASIN CHARACTERIZATION)

2.1 Introduction

The RAP, Step 3 of the AMS process, describes the current condition, amount, location, use, demands, etc. of each of the resources in the Planning Area. This is a summary of that information. The complete profiles will be used as the basis of the affected environment section of the RMP/EIS. This information also serves as the summary of the subbasin characterization, which is also Step 3 of the Subbasin Review Process (Chapter 6). The descriptions of the mid-scale character apply to findings related to watershed, renewable resources (such as vegetation, forestry and wildlife), fire management, and human uses and values resources addressed by the ICBEMP scientific assessments (USFS and BLM 1996; Quigley et al.1996).

The following is a description of the resources in the Andrews MU and the Steens Mountain Steens Mountain CMPA. Most of the resources are described separately for each area due to the different management scenarios for the Andrews MU and the Steens Mountain CMPA.

2.2 Air Quality

Under criteria established through the Clean Air Act as amended in 1990, the Planning Area has been designated as Class II. This means that air quality is good to excellent; however, the potential to impact Class I air sheds (i.e., Strawberry Mountain Wilderness), does exist and additional measures will be required to avoid those impacts. Strawberry Mountain Wilderness, 65 miles northeast of the Planning Area, is the closest Class I air shed. The nearest Non-Attainment Area is Lakeview, Oregon. The air pollutant of most concern on BLM administered land is particulate matter, which may originate from fire, road or windblown dust, and vehicle use. Most of this particulate matter is produced from fire, and is less than ten microns in diameter (called PM_{10}).

2.3 Soils

2.3.1 Andrews Management Unit

Soils in semiarid southeastern Oregon are young and poorly developed. Chemical and biological soil-building processes such as rock weathering, decomposition of plant materials, accumulation of organic matter, and nutrient cycling proceed slowly in this environment. Since soil recovery processes are also slow, disruption of soils can lead to long-term changes in ecological condition and productivity. In many areas, natural or geologic erosion happens too rapidly for distinct, deep soil horizons to develop.

Soil productivity varies widely due to characteristics such as soil depth, nutrient status, available water-holding capacity, and site characteristics including elevation, aspect, and slope gradient. The most productive soils for forage or wood fiber are found in valley bottoms, toeslopes, benches, and broad ridgetops. A productive ecosystem depends on maintenance of soil productivity. Current soil productivity reflects site-specific natural conditions and past management practices.

Surface management actions affect, to varying degrees, the following soil characteristics: soil bulk density (weight per unit volume), porosity (hydrologic conductivity), soil temperature, organic matter content, moisture content, and nutrient content. These factors in turn affect soil hydrologic response, productivity, nutrient cycling, water-holding capacity, and soil erosion rates.

Management practices may affect soil productivity by influencing disturbances such as displacement, compaction, erosion, and alteration of organic matter and soil organism levels. Natural processes are slow to restore soil productivity in this semiarid region; therefore, prevention of soil degradation is the most time- and cost-effective remedy.

Soil compaction from concentrated activities such as equipment operation, grazing, and pedestrian traffic causes increased surface runoff and plant stress due to decreased root penetration and water infiltration. These factors decrease site productivity, increase soil erosion rates, and degrade water quality.

Soil erosion varies throughout the resource area. In the semi-arid areas of the subbasin review area, bare soil between plants comprises ten to 20 percent of the total ground cover of a native plant community, leaving significant areas of exposed soil between plants to erode naturally. In addition to this background erosion rate, management regimes affect the rate at which soil erodes from a landscape. Any activities that remove vegetative cover increase the erosion rate. If the surface layers of vulnerable soils are washed or blown away, the productivity potential may be lost.

Historically, erosion occurred on upland soils and in drainage channels as a result of uncontrolled land use,

prolonged drought, and catastrophic storms. Ephemeral drainages were deeply incised by gully erosion more than 30 years ago. Some geologic and localized erosion, caused by concentrated uses, still occurs. The effects of lost soil productivity persist in some areas in the form of early seral stage plant communities (annuals). An erosion control plan should be developed in conjunction with road building, mining projects, and other construction activities. Disturbed areas should be reseeded to restore plant cover and managed in order to avoid overgrazing and its resulting increased soil erosion rate.

Current management practices have reduced erosion. These practices include proper stocking rates for livestock, rotation of grazing, periodic rest from grazing, improved design of roads, rehabilitation of unneeded surface disturbance, restriction of vehicles to roads and trails, rehabilitation of mined areas, and control of concentrated recreational activities.

Microbiotic crusts consist of lichens, mosses, green algae, fungi, cyanobacteria, and bacteria growing on or just below the soil surface in a thin layer. Found in open spaces between larger plants, these crusts, or rather some of the organisms in these crusts, play a role in fixing nitrogen, filtering water, retaining soil moisture, and controlling soil erosion. Limited data exist on the extent, distribution, and role of microbiotic crusts. Most studies of microbiotic crusts have been conducted in the southern Great Basin and Colorado Plateau.

The Andrews MU was covered by an Order III soil survey completed in 1994 for the Harney County Area by the National Cooperative Soil Survey. Soil types are shown on Figure 2.1. Table 2.1 describes the general types of soils found in the Andrews MU.

2.3.2 Steens Mountain Cooperative Management and Protection Area

The primary types of soils found in the Steens Mountain CMPA are Baconcamp-Clamp-Rock outcrop and Ninemile-Westbutte-Carryback. Less common soils include Raz-Brace-Anawalt and Atlow-Tumtum-Deppy. Minor amounts of Felcher-Skedaddle, Fury-Skunkfarm-Housefield and Reallis-Vergas-Lawen are also located in the Steens Mountain CMPA.

2.4 Vegetation

2.4.1 Andrews Management Unit

The existing vegetation in the Planning Area is discussed at three levels. The top level is the entire subbasin, which falls within the Basin and Range Province; the mid-level is the actual plant communities themselves; the project level consists of the ecological site inventories, which examines the potential for plant communities in a specific area on a small scale.

The Basin and Range Province in Oregon is dominated by sagebrush/native bunchgrass communities. Sagebrush species growth is site specific. Basin big sagebrush grows mainly on sites having moderately deep loamy soils such as droughty bottomlands and fans. Wyoming big sagebrush is present almost everywhere throughout the lower elevations of the province on slightly sandy or gravelly soils. Mountain big sagebrush occurs in similar soils, but at higher elevations. Low sagebrush/bunchgrass communities are strongly dominant on shallow to very shallow stony upland lithic soils. Stiff sagebrush/bunchgrass communities dominate on shallow soils that are either stony or clayey. Silver sagebrush dominates internally drained basins with seasonally saturated soils. Black sagebrush/bunchgrass communities are found on shallow soils with a calcareous layer. Perennial grassland communities do not form a major climax vegetation type, although they do dominate for a period following fire when the shrub component is eliminated. Although western juniper generally occurs as a vegetation type in many woodland communities, it has also invaded big sagebrush/bunchgrass and low sagebrush/bunchgrass communities on mesic sites where it has not been limited by wildland fires. General Vegetation Types in the Planning Area are illustrated on Figure 2.2. Vegetation types and acreages are listed in Table 2.2 for the Andrews MU and the Steens Mountain CMPA.

2.4.1.1 Big Sagebrush Shrubland Communities

Big Sagebrush Shrubland (*Artemisia tridentata* ssp. *tridentata* and ssp. *wyomingensis*) is the most common vegetative cover type in southeastern Oregon. It appears as a mosaic with shrub-steppe communities over much of the unwooded areas along mountain range foothills and expansive extent in the valley floor. There are several different mixtures of plants within the big sagebrush mosaics. These are big sagebrush 1) with perennial grasslands, 2) with annual grasslands

Table 2.1: Soil Types in the Andrews Management Unit

Map No.	Soil Type	Description
1	Alvodest-Droval-Playas	Poorly to very poorly drained, very deep soils formed in lacustrine sediments on low lake terraces and basin floors; 0 to 3 percent slopes
2	Spangenburg-Enko-Catlow	Well or moderately well drained, very deep soils formed in lacustrine sediments and alluvium on middle lake terraces; 0 to 20 percent slopes
3	Atlow-Tumtum-Deppy	Well drained, very shallow or shallow soils formed in old alluvium, residuum, or colluvium on high lake terraces and low hills; 2 to 50 percent slopes
4	Gumble-Risley-Mahoon	Well drained, shallow or moderately deep soils formed in residuum, and colluvium on hills and tablelands; 2 to 40 percent slopes
5	Felcher-Skedaddle	Well drained, very shallow to moderately deep soils that formed in colluvium and residuum on mountains; 20 to 70 percent slopes
6	Fury-Skunkfarm-Housefield	Somewhat poorly to very poorly drained, very deep soils formed in alluvium and lacustrine sediments on stream terraces, and lake terraces; 0 to 2 percent slopes
7	Poujade-Ausmus-Swalesilver	Moderately well and somewhat poorly drained very deep soils formed in lacustrine sediments, and alluvium on middle lake terraces; 0 to 5 percent slopes
8	Reallis-Vergas-Lawen	Well drained, very deep soils that formed in alluvium and eolian material on high lake terraces and fan terraces; 0 to 8 percent slopes
9	Baconcamp-Clamp-Rock outcrop	Well drained, shallow or moderately deep soils formed in residuum, and colluvium; 5 to 80 percent slopes
10	Raz-Brace-Anawalt	Well drained, shallow or moderately deep soils formed in residuum and colluvium on tablelands having 8 to 12 inches of precipitation; 0 to 30 percent slopes
11	Ninemile-Westbutte-Carryback	Well drained, shallow and moderately deep soils that formed in residuum and colluvium on tablelands and hills having 12 to 16 inches of precipitation; 0 to 70 percent slopes
12	Merlin-Observation-Lambring	Well drained, shallow to very deep soils formed in residuum and colluvium on shrub and grass covered hills; 0 to 70 percent slopes

Table 2.2: General Vegetation Types in the Planning Area

General Vegetation Type	Andrews MU BLM Acres	CMPA BLM Acres
Unsurveyed/Unknown Vegetation Type	17,419	835
Annual Grassland	2,475	1,220
Crested Wheatgrass	9,014	12,506
Big Sagebrush/Crested Wheatgrass	13,333	6,882
Big Sagebrush/Perennial Grassland	457,672	84,939

General Vegetation Type	Andrews MU BLM Acres	CMPA BLM Acres
Low Sagebrush/Grassland	104,681	130,419
Silver Sagebrush/Grassland	4,071	1,085
Black Sagebrush/Grassland	17,148	0
Mountain Big Sage/Perennial Grassland	15,463	41,584
Salt Desert Shrub/Grassland	200,967	321
Mountain Shrub/Grassland	7,658	6,538
Juniper/Big Sagebrush	1,083	52,659
Juniper/Low Sagebrush	1,740	51,128
Playas	36,141	395
Quaking Aspen	3,168	10,748
Native Perennial Grassland	2,785	8,425
Rabbitbrush/Grassland	8,883	5
Rock	1,512	1,466
Big Sagebrush/Annual Grassland	316,101	16,997
Total	**1,221,314**	**428,152**

(cheatgrass), 3) within planted crested wheatgrass, 4) with a variety of shrubs such as bitterbrush (*Purshia tridentata*), and 5) with western juniper (*Juniperus occidentalis*). Other combinations of plants with sagebrush as the dominant plant are big sagebrush 1) with black greasewood (*Sarcobatus vermiculatus*), 2) with shadscale (*Atriplex confertifolia*), 3) with limited distribution of winterfat (*Krascheninnikovia lanata*), and 4) with rabbitbrush (*Ericameria viscidiflorus*).

Native grasses range from a mere presence of grass to an abundance of grass, depending on history of the site and beneficial soil/water relations. Native perennial bunchgrasses include bluebunch wheatgrass (*Pseudoroegneria spicatum*), Sandberg's bluegrass (*Poa secunda*), Idaho fescue (*Festuca idahoensis*), Great Basin wildrye (*Leymus cinereus*), junegrass (*Koeleria macrantha*), needle and thread grass (*Achnatherum comata*), Thurber's needlegrass (*Achnatherum thurberiana*), and in more disturbed situations, bottlebrush squirreltail (*Elymus elimoides*). Introduced grasses are primarily cheatgrass *(Bromus tectorum*) and crested wheatgrass (*Agropyron cristatum*).

The sagebrush community in the Steens Mountain CMPA occurs between 4,300 and 5,500 feet in elevation. The lower flanks of Steens Mountain are dominated by mountain big sagebrush, low sagebrush, rabbitbrush, and a variety of forbs and grasses including bluebunch wheatgrass, needlegrass, lupine, biscuitroot, and buckwheat. Much of the Wyoming big sagebrush habitat on the west side of Steens Mountain has been planted to crested wheatgrass and occasionally yellow sweetclover and fourwing saltbush. Western juniper extends into this community from above, along basaltic fractures occupied by currant, ocean spray, and other shrubs. Riparian woodlands dominated by willow, alder, black cottonwood, cherry, and dogwood interrupt the broad expanses of sagebrush scrub.

2.4.1.2 Black Sagebrush/Grassland Communities

Black sagebrush (*Artemisia nova*) has a limited distribution in the Basin and Range Province and is considered a "rare type" in this province. This plant community is found on shallow soil plateaus and gentle slopes. The sites have extensive areas of exposed rock and wildland fire occurrence is rare with a mean return interval, or average number of years between fire events, of approximately 100 to 200 years. Sandberg's bluegrass (*Poa secunda*) is usually the dominant grass, making up most of the vegetation cover; however, other bunch grasses also occur on these sites. Black sagebrush is the dominant shrub and often the only shrub present. In some areas, these black sage stands can be extensive or occur in a mosaic with low

(*Artemisia arbuscula*) or big sagebrush species. Shadscale, squirreltail and cheatgrass also occur on these sites.

2.4.1.3 Silver Sagebrush/Grassland Communities

The silver sagebrush (*Artemisia cana*) /grassland community is usually found in valley bottomlands. Silver sage is the dominant and characteristic shrub of this community. This tall shrub community is moderately to widely spaced. It grows in areas that have been deflated (eroded by wind) and subsequently partially filled with ingrained sediments. Although species such as creeping wildrye (*Elymus triticoides*) occasionally occur, the understory can be dominated by widely spaced, often robust bunchgrasses such as Nevada bluegrass (*Poa nevadensis*).

2.4.1.4 Low Sagebrush/Grassland Communities

Low sagebrush (*Artemisia arbuscula*) communities are found throughout eastern Oregon, generally on areas with shallow basalt soils. Low sagebrush is the primary dominant and often the only shrub in the stand; however, Sandberg's bluegrass is also commonly found, as well as western juniper. Other associated grasses are bluebunch wheatgrass, Idaho fescue, Thurber's needlegrass, Nevada bluegrass, and cheatgrass. The low sagebrush plant communities usually occur on soils where rooting depth is restricted by bedrock or a heavy clay layer. The restricted rooting profile lowers the site productivity. Low sagebrush occupies some large areas of land, especially on the southern end of Steens Mountain. In other areas, low sagebrush plant communities are found in a complex mosaic with other sagebrush plant communities such as Wyoming and mountain big sagebrush. The sites have extensive areas of exposed rock and often do not have enough vegetation to support wildland fires. Low sagebrush can also occur within an aspen mosaic. After the snow melts and soil warms in the spring, these areas are rich with colorful and diverse perennial and annual wildflowers.

2.4.1.5 Mountain Big Sagebrush/Grassland Communities

At higher elevations in the Great Basin Province, mountain big sagebrush (*Artemisia tridentata spp. vaseyana*) communities occur on plateaus and rocky flats with minimal soil development. Sandberg's bluegrass, bluebunch wheatgrass, Idaho fescue, Nevada bluegrass, cheatgrass, bitterbrush, wax currant, snowberry, and grey rabbitbrush are common in this community type. This medium to medium-tall shrubland varies from widely spaced to fairly dense shrubs occurring on deep-soiled to stony flats, ridges and mountain slopes, and usually in cool moist areas with some snow. In this community, Idaho fescue is the most common and diagnostic grass. Mountain big sagebrush is usually the dominant shrub.

2.4.1.6 Mountain Shrubland Communities

Mountain shrubland is found on the steep rocky slopes of mountains in southeastern Oregon. It usually appears as a minor component within the western juniper woodland types or it grades in and out of sagebrush steppe. This cover type is commonly encountered but generally exists as units that are too small to be mapped. This widely dispersed tall shrubland grows in rock talus and rock outcrops, in soil pockets within rocky slopes, and along with big sagebrush. It can be the dominant overstory vegetation with occasional western juniper and low sage or bitterbrush, and some grasses such as bluebunch wheatgrass, Idaho fescue, and Columbia needlegrass (*Stipa columbiana*). Bitterbrush communities are found in a medium-tall shrubland steppe with bunchgrass or cheatgrass understory. Bitterbrush can be dominant or co-dominant with big sagebrush. Idaho fescue is the characteristic native bunchgrass, with bluebunch wheatgrass co-dominant at lower elevations. Western needlegrass is dominant at the higher elevations and where soils are more sandy. Snowberry communities are found on steep slopes between alpine habitats and riparian or sagebrush steppe. Many forbs grow in the area with snowberry as does mountain mahogany, aspen, and mountain big sagebrush. Juniper can be found with these shrubs at lower elevations.

2.4.1.7 Juniper Woodlands

Western juniper woodlands occupy a large and diverse area within the Planning Area. Historically, western juniper occupied the rocky ridge tops and shallow soils areas. These woodlands were very open with less than 25 mature trees per acre. The shallow soils inhibited growth of understory shrubs and herbaceous plants, so that these sites developed with limited influence of fire. Western juniper is readily killed by fire due to its fairly thin bark. Fires were typically small, involving less than one acre and fewer than five trees; however, every 150 to 200 years a large fire event occurred, burning large acreages. Trees on these areas are often over 200 years old. In some areas, certain trees established over 1,000 years ago.

Trees of pre-settlement age (>150 years) develop characteristic rounded canopies, which begin to senesce as the trees approach 500 years old. Deep furrows

develop in the trunk and the outer layers of bark begin to peel off in strips. Most of the trees in these ancient western juniper stands have cavities in the boles, which are extremely important to cavity nesting birds such as western bluebirds. Shrubs and herbaceous understory in these ancient stands can be sparse in areas of shallow soil; however, where rooting is limited by a clay layer (often less than 12 inches from the soil surface), perennial grasses and forbs dominate the understory and shrubs are incidental in the plant community. Idaho fescue is the most common grass in these areas. The majority of the western juniper woodlands in the Andrews RA, including the Steens Mountain CMPA, are post-settlement stands that are less than 120 years old. These trees and the associated plant communities vary substantially from the pre-settlement stands. Density and cover is much higher than the pre-settlement stands, and the tree canopies are cone-shaped.

In the early stages of western juniper encroachment, the trees enhance the structural and biological diversity of the site. Animal species, such as the Townsend's solitaire, that prefer woodland vegetation begin to utilize the area; however, as tree density increases and understory shrubs, grasses and forbs decrease, species that prefer open shrub dominated vegetation move to other areas. Sage thrashers, sage sparrows, and green-sided towhees are a few of the species that no longer use an area once the stand reaches a mid-transitional stage. Understory grasses, forbs and shrubs begin to decline at this stage. As tree density and cover increase, the shrub layer is the first component to be lost, followed by deep rooted perennial grasses and forbs. In this mid-transitional stage, the decline in the herbaceous plant component is most pronounced on the shallower soil areas and on slopes with southern aspects. Understory grasses and forbs occurring on deeper soils will not decline to the same degree. In some cases, a fully mature western juniper woodland with more than 50 percent tree cover may support a fairly complete herbaceous plant understory having cover of 25 to 30 percent. In contrast, the plant cover on shallow soils and south slopes would be less than five percent total for the site. Trees in fully mature western juniper woodlands are of similar heights and canopy diameters. Understory plants cover less than five percent of the soil surface and there is apparent surface soil movement.

Juniper woodlands in the Steens Mountain CMPA occur between 5,500 to 6,700 feet in elevation and are dominated by western juniper. Mountain big sagebrush, Idaho fescue, needlegrass, and low sagebrush occupy drier sites in this community. Mountain mahogany, bitterbrush, wax currant, and Lemmon's needlegrass dominate the rimrock areas. Seasonally moist depressions, vernal pools, clay barrens, riparian meadows, seeps, gorge-bottom woodlands, and mesic north-facing quaking aspen dominated slopes all contribute to the habitat diversity in this community.

2.4.1.8 Quaking Aspen/Alpine Bunchgrass Communities

Quaking aspen (*populus tremuloides*) communities are scattered throughout the sagebrush/grasslands of eastern Oregon in clonal clumps that may be too small to map. In the Planning Area, these communities occur in isolated pockets in mountain sagebrush areas and can be found mixed with western juniper, which is replacing quaking aspen in many lower elevation communities. Management of these communities needs to be addressed to reduce the number of acres converted to western juniper woodlands. Aspen is the dominant tree in this cover type. The shrub layer is conspicuous and usually includes snowberry and chokecherry (*Prunus virginiana*), bittercherry (*Prunus emarginata*), Columbia needlegrass, and mountain brome (*Bromus marginatus*). Other shrubs can be mountain big sagebrush, bitterbrush, and mountain mahogany. The understory is dominated by sedges and grasses such as bluebunch wheatgrass and Idaho fescue.

The aspen community in the Steens Mountain CMPA occurs between 6,700 and 8,000 feet in elevation. The subalpine elevations of Steens Mountain are a mosaic of aspen stand, sagebrush grasslands, rimrock/talus and riparian meadow. Aspen groves dominate sheltered and mesic sites between approximately 6,000 and 7,700 feet in elevation. Snowberry and wax currant are also dominant shrubs at this elevation. The more exposed and dry sites are frequently dominated by mountain big sagebrush and a variety of forbs and grasses, including sneezeweed, Steens thistle, paintbrush, lupine, squirreltail and Cusick's bluegrass. Meadows and springs are dominated by species such as sedges, rushes, hellebore, pussytoes, and cinquefoil.

The Alpine Bunchgrass community on Steens Mountain occurs at elevations greater than 8,000 feet. The highest vegetation zone on Steens Mountain has been referred to as either subalpine grassland or true alpine tundra. The dry, gravelly, windswept summit ridges have a characteristic xeric flora including cut-leaf daisy, sulfur-flowered buckwheat, balloon-pod milkvetch, prairie smoke, Steens paintbrush, and needle-leaf sandwort. Dry bunchgrass communities below the ridge crests are dominated by Sandberg's bluegrass, sheep fescue and sedges. A complex assortment of alpine wet and mesic

meadows occurs in cirques and pockets where snow accumulates and provides perennial water in the form of springs or a high water table. Common species in this area include American bistort, cinquefoil, monkeyflower, speedwell, buttercup, elephant's head, sedges, rushes, and redtop.

2.4.1.9 Riparian and Wetland Communities

The numerous closed basins typical of the Basin and Range Province include dry lakebeds, infrequently and briefly inundated lakebeds, perpetual lakes that fluctuate in size over time, and wetlands and marshes that are reasonably perpetual. Vegetation on these bottomlands varies according to the frequency, duration, and depth of inundation. From a total ecosystem viewpoint, probably the most significant and valuable wetlands in the Basin and Range Province are those associated with isolated springs and streams scattered over the landscape. The variety of shrubs, grasses, and forbs present depends on the degree and duration of moisture and shade at each location.

Included in these plant communities are the willow floodplain riparian areas of tall shrub communities with dense cover of willows, occasionally interspersed with wetlands, sedge meadows or moist, forb-rich grassland. This community occurs in broad valley floors, narrow riparian canyons, and along rivers and streams. Cottonwood, several willow species, wormwood (*Artemisia spp.*), gooseberry, rose, snowberry, red osier dogwood, serviceberry, alder, and chokecherry are usually found along many rivers. In the past, cottonwood was probably more prevalent. Stinging nettle (*Urtica dioica*), and cow parsnip (*Heracleum lanatum*) are often present. Hardstem bulrush-cattail marshes form open to dense, nearly monotypic stands of bulrush, where standing water is found throughout much of the growing season. Patches of cattail, burred, and several species of *Scirpus* are the most important graminoids. *Carex* species occur in and around this type, along with *Eleocharis* and *Juncus* species. In some areas, spike rush (*Eleocharis*) forms a monotypic community along wetland channels. Scattered throughout the area are sedge montane meadows and wetlands, also tall sedge meadows and wetlands, where dense rhyzomatous or tufted sedges dominate the meadows. Usually these areas are forb-poor. Hairgrass (*Deschampsia caespitosa*) is the most important grass, occurring at the drier margins. The forbs often present are *Potentilla gracilis*, *Geum* spp., *Lupinus* spp., *Lomatium triternatum*, blue camas (occasionally), and *Perideridium* species. *Salix* species dominate streams which run though these meadows. Tufted hairgrass (*Deschampsia caespitosa*) montane meadows and valley prairie occur in a few areas of the subbasin review area.. These tall montane meadow grasslands with dense tufted grasses range from forb-rich to grass-sedge dominated areas. Occasionally, willows, silver sagebrush, or black greasewood are present. Tufted hairgrass is the most important and dominant species. In some areas, *Poa nevadensis* or *P. cusickii* are entirely dominant. *Carex* and *Juncus* species are co-dominant in wetter margins.

2.4.1.10 Salt Desert Scrub/Grassland Communities

This plant community occurs in the alkaline playa lake basins of the Great Basin Province. These are low to tall shrub communities comprised of dispersed alkali-tolerant vegetation. "Salt desert scrub" is a catchall term that describes several differing environments most common in the southern Great Basin. On the most saline seasonally flooded sites, black greasewood *(Sarcobatus vermiculatus*) dominates. Sites with better drainage support the following shrubs and grasses which are halophytes (salt tolerant plants): shadscale, spiny hopsage (*Artiplex spinosa*), budsage (*Artemisia spinescens*), saltgrass (*Distichlis spicata*), bottlebrush squirreltail, and Great Basin wildrye. Salt desert scrub is surrounded by big sagebrush or sagebrush steppe cover types. The most extensive areas are always associated with the large ephemeral lakes of the region.

In the Steens Mountain CMPA, the salt desert scrub community occurs below 4,300 feet in elevation. Salt desert scrub vegetation of the Alvord Desert is dominated by shadscale, four-wing saltbush, greasewood, spiny hopsage, saltgrass, and other halophytes. The Harney Basin at the western base of Steens Mountain also contains the desert scrub vegetation as well as the freshwater Malheur marsh. Marshes throughout the three basins surrounding Steens Mountain are dominated by bulrush and cattail, and depending on water depth and locality, a variety of other emergent species as described in Section 2.4.1.9.

2.4.1.11 Modified Grassland - Crested Wheatgrass and Cheatgrass Communities

Approximately two percent of the public lands in the planning area have been planted with crested wheatgrass or have been invaded by cheatgrass. Both of these species originated in Eurasia and have adapted very well to these soils and climate. Cheatgrass, an annual, was inadvertently introduced into America with cattle and in hay used for ship ballast. It can out-compete the native grasses by germinating in the fall. Presently, these grasslands are used primarily for

grazing. Weedy native and exotic annual forbs may also be present or even dominate. These large expanses of cheatgrass can be the result of fires, unsuccessful seedings, historic overgrazing, abandoned farming, or other disturbances. Weedy forbs such as tumblemustard (*Sisymbrium* species), cranesbill (*Erodium cicutarium*), tumbleweed (*Salsola kali*), horned buttercup (*Ranuculus testiculatus*), and thistle (*Cirsium* species) are often common in these areas.

In the past, many acres were planted with crested wheatgrass after wildland fires. These communities remain in a dominant crested wheatgrass community for about ten years until sagebrush and rabbitbrush invade. Forbs commonly found in this community type include yarrow, milkvetch, arrowleaf balsamroot, spreading phlox, salsify, and mullein. This type is often restricted to foothill margins and gentle terrain in close proximity to valley bottoms, while the undisturbed remnants of this type are dominated by native perennials. Green and gray rabbitbrush are common, and sagebrush occurs locally when the seedings have aged.

2.4.2 Steens Mountain Cooperative Management and Protection Area

The plant communities of the Steens Mountain CMPA are discussed in the previous subsections of 2.4.1. In addition, Table 2.2 lists the general vegetation present in the Steens Mountain CMPA.

2.5 Special Status Plant Species

2.5.1 Andrews Management Unit

Table 2.3 lists special status plant species found in the Planning Area. These species receive priority attention for inventory, research, and monitoring efforts. Federal, state, and nongovernmental agencies have been consulted to assure their protection and management. Special status plant surveys are made prior to land exchanges, range and wildlife projects, proposed mining operations, and other surface disturbing activities.

Approximately 83 plant species are on the Planning Area list of special status plants (Table 2.3). Nearly all of the plants on the list are rare in Oregon, but common or stable in areas outside of Oregon. Special status plant species occur in a variety of plant associations and on a variety of physical habitats, many of which have distinctive soil types. Several special status species often occur together. When a new location for a special status plant species is observed, the information is documented and reported to the Oregon Natural Heritage Database, where it is permanently recorded.

2.5.2 Steens Mountain Cooperative Management and Protection Area

Many of the plants listed for the Andrews MU occur in the area of the Steens Mountain CMPA. Table 2.3 contains special status plant species found in the Steens Mountain CMPA.

2.6 Noxious Weeds

In Oregon, as well as in other western states, noxious weeds are so thoroughly established and spreading so rapidly that they have been declared a menace to public welfare (ORS 570.505). Noxious weed invasion contributes to the loss of rangeland productivity, increased soil erosion, reduced species and structural diversity, and loss of wildlife habitat. In some instances, such invasion is hazardous to human health and welfare, as emphasized in the Federal Noxious Weed Act (PL 93-629). Some weed species pose a significant threat to multiple-use management of public land.

Noxious weeds cannot be adequately controlled unless federal, state, county, and private interests work together. The Carlson-Foley Act (PL 90-583), as well as state and county laws, make the federal government responsible for control of weeds on federal land and provide direction for their control. The Burns District of the BLM operates under the weed protocols set forth in the following documents: Vegetation Treatment on BLM Lands in Thirteen Western States FEIS and ROD (1991a), Supplement to the Northwest Area Noxious Weed Control Program FEIS and ROD (1987), and the Noxious Weed Management Program Environmental Assessment (EA) #OR-020-98-05 (1998a).

The Oregon Department of Agriculture (ODA) has developed a classification system to provide guidelines for implementing and prioritizing noxious weed control programs, to assist in the distribution of limited funds, and to serve as a model for other weed classification systems (ODA 1997). This system defines three classes of noxious weed species: 1) weeds that pose a known economic threat and occur in infestations small enough to make eradication or containment possible; 2) weeds that pose an economic threat and whose regional abundance limits control techniques primarily to biological methods; and 3) weeds for which the ODA will implement a statewide management plan.

Table 2.3: Special Status Species Plants in the Planning Area

Common Name	Scientific Name	BLM Status	ONHP Status	CMPA	AMU
Alvord milkvetch	*Astragalus alvordensis*	T	L3		X
alpine fescue	*Festuca brachyphylla*	T	L3	X	
awned sedge	*Carex atherodes*	T	L3		X
Back's sedge	*Carex backii*	A	L2	X	
Bellard's kobresia	*Kobresia bellardii*	T	L3	X	
Biddle's lupine	*Lupinus biddlei*	S	L3	X	X
Bigelow's four-o'clock	*Mirabilis bigelovii var retrorsa*	T	L3		X
capitate sedge	*Carex capitata*	T	L3	X	
Cusick's hyssop	*Agastache cusickii*	A	L2	X	X
Cusicks's draba	*Draba sphaeroides var cusickii*	T	L3	X	
dark alpine sedge	*Carex subnigricans*	T	L3	X	
Davidson's penstemon	*Penstemon davidsonii var. praeteritus*	T	L3	X	X
Davis' peppergrass	*Lepidium davisii*	S	L1		X
desert needlegrass	*Achnatherum speciosum*	A	L2	X	X
desert chaenactis	*Chaenactis xantiana*	A	L2		X
discoid goldenweed	*Ericameria discoidea var discoidea*	T	L3	X	
Drummond willow	*Salix drummondiana*	T	L3	X	
dwarf evening primrose	*Camissonia pygmaea*	S	L1	X	
ephemeral monkey flower	*Mimulus evanescens*	S	L1	X	
flowering quillwort	*Lilaea scilloides*	T	L3		X
foetid sedge	*Carex foetida var. vernacular*	T	L3	X	
Fourwinged milkvetch	*Astragalus tetrapterus*	T	L3		X
gray moonwort	*Botrychium minganese*	A	L2	X	
hairstemmed rush	*Juncus capillaris*	T	L3	X	
hairy wild cabbage	*Caulanthus pilous*	T	L3		X
Hayden's cymopterus	*Cymoperus nivalis*	A	L2	X	
Hayden's sedge	*Carex haydeniana*	T	L3	X	
hedgehog cactus	*Pediocactus simpsonii var. robustior*	T	L3	X	X
iodine bush	*Allenrolfea occidentalis*	A	L2		X
Janish's penstemon	*Penstemon janishiae*	T	L3	X	
Kruckeberg's holly fern	*Polystichum kruckebergii*	T	L3	X	
lance-leaved grapefern	*Botrychium lanceolatum*	A	L2	X	
large-flowered chaenactis	*Chaenactis macrantha*	A	L2		X
least rush	*Juncus hemiendytus var. abjectus*	T	L3	X	

Common Name	Scientific Name	BLM Status	ONHP Status	CMPA	AMU
long-flowered snowberry	*Symphoricarpos longiflorus*	A	L2	X	X
lyrate malacothirx	*Malacothrix sonchoides*	T	L3		X
Malheur cryptantha	*Cryptantha propria*	T	L3		X
moonwort	*Botrychium minganense*	A	L2	X	
montane pepperwort	*Lepidium montanum var. nevadense*	T	L3		X
moss gentian	*Gentiana prostata*	A	L2	X	
mosslike dwarf rush	*Juncus bryoides*	T	L3	X	
naked-stemmed phacelia	*Phacelia gymnoclada*	A	L2		X
narrowleaf cottonwood	*Populus angustifolia*	T	L3	X	X
new sedge	*Carex nova*	T	L3	X	
nodding melic	*Melica stricta*	T	L3	X	X
ochre-headed buckwheat	*Eriogonum ochrocephalum ssp. Calcareum*	T	L3		X
pale paintbrush	*Castilleja pallescens var. inverta*	T	L3		X
pinnate grapefern	*Botrychium pinnatum*	A	L2	X	
prickly poppy	*Argemone munita spp. rotundata*	A	L2	X	X
purple cymopterus	*Cymopterus purpurascens*	A	L2		X
Rafinesque's pondweed	*Potamogeton diversifolius*	A	L2	X	X
Raven's lomatium	*Lomatium ravenii*	A	L2		X
Rocky Mtn. Helianthella	*Helianthella uniflora var. uniflora*	T	L3	X	
salt heliotrope	*Heliotropium curassavicum*	T	L3		X
short-fruited willow	*Salix brachycarpa var brachycarpa*	T	L3	X	
short-lobed penstemon	*Penstemon seorsus*	T	L3	X	X
Siberian water-milfoil	*Myriophyllum sibiricum*	T	L3	X	X
Sierra willow	*Salix orestera*	T	L3	X	
Sierran springbeauty	*Claytonia nevadensis*	T	L3	X	
sky pilot	*Polemonium viscosum*	T	L3	X	
slender gentian	*Gentianella tenella*	A	L2	X	
slender wild cabbage	*Caulanthus major var. nevadensis*	S	L1		X
Steens Mountain paint brush	*Castilleja pilosa var. steenensis*	S	L3	X	
teacher's sedge	*Carex praeceptorum*	T	L3	X	X
thick-stemmed wild cabbage	*Daulanthus crassicaulis*	T	L3		X
Tiehm's rush	*Juncus tiehmii*	T	L3	X	
Torrey's malacothrix	*Malacoathrix torreyi*	T	L3		X
two-stemmed onion	*Allium bisceptrum*	T	L3		X
Umbellate springbeauty	*Claytonia umbellata*	T	L3	X	
Verrucose seapurslane	*Sesuvium verrucosum*	A	L2		X
weak-stemmed stonecrop	*Sedum debile*	T	L3	X	

Common Name	Scientific Name	BLM Status	ONHP Status	CMPA	AMU
wedge-leaf saxifrage	*Saxifraga adscendens var.oregonensis*	A	L2	X	
white-flowered penstemon	*Penstemon pratensis*	T	L3	X	X

BLM Status
S=Sensitive - species that could easily become endangered or extinct in a state, are restricted in range, and have natural or human-caused threats to survival.
A=Assessment - species not presently eligible for official federal or state status but are still of concern and need protection or mitigation in BLM activities.
T=Tracking - species that may become of concern in the future, but more information is needed to determine status for management purposes.
ONHP Status
L1 - taxa threatened with extinction or presumed to be extinct throughout their range.
L2 - taxa threatened with extirpation or presumed to be extirpated from the State of Oregon.
L3 - taxa of conservation concern that need more information to determine status.

Table 2.4: Noxious Weed Species in the Andrews MU and Steens Mountain CMPA

Common Name	Scientific Name	County Rating	Reported in AMU	Reported in CMPA	No Reports in Planning Area
bindweed	*Convolvulus arvensis*	C	X	X	
black henbane	*Hyoscyamus niger*	A	X		
bull thistle	*Cirsium vulgare*	NR	X	X	
Canada thistle	*Cirsium arvense*	C	X	X	
dalmation toadflax	*Linaria dalmatica*	B	X	X	
diffuse knapweed	*Centaurea diffusa*	A	X	X	
halogeton	*Halogeton glomeratus*	C	X		
hound's tongue	*Cynoglossum officinale*				
kochia	*Kochia scoparia*				
leafy spurge	*Euphorbia esula*	A			X
Mediterranean sage	*Salvia aethiopis*	B	X	X	
medusahead rye	*Taeniatherum caput-medusae*	B		X	
musk thistle	*Carduus nutans*	A			X
perennial pepperweed	*Lepidium intifolium*	B	X	X	
poison hemlock	*Conium maculatum*				
puncturevine	*Tribulus terrestris*	B	X		
purple loosestrife	*Lythrum salicaria*	A			X
rush skeletonweed	*Chondrilla juncea*	A			X
Russian knapweed	*Centaurea repens*	B	X	X	
scotch thistle	*Onopordum acanthium*	B	X	X	

Common Name	Scientific Name	County Rating	Reported in AMU	Reported in CMPA	No Reports in Planning Area
salt cedar	*Tamarix parviflora*	A	X	X	
scotch broom	*Cytisus scoparius*	A			X
spotted knapweed	*Centaurea maculosa*	A	X	X	
squarrose knapweed	*Centaurea virgata*	A			X
St. John's wort	*Hypericum perforatum*	C	X	X	
tansy ragwort	*Senecio jacobaea*	A		X	
Whitetop	*Cardaria spp.*	C	X	X	
yellow starthistle	*Centaurea solstitialis*	A	X	X	
yellow toadflax	*Linaria vulgaris*	A		X	

Harney County has listed and classified the noxious weeds currently present or in close proximity to Harney County. The weeds are rated as A, B, or C pests. Weeds rated as "A" pests are of known economic importance, known to occur in the county in small enough infestations to make eradication practicable, or not known to occur but having such status in surrounding counties that future occurrence seems imminent. Weeds rated as "B" pests are of known economic importance, are of limited distribution in the county, and are subject to intensive control or eradication where feasible at the county level. Weeds rated as "C" pests are of known economic importance and of general distribution that is subject to control, intensive control, or eradication as local conditions warrant.

Noxious weeds are present throughout the subbasin review area. These weeds have become established in the Planning Area primarily because of vehicle use on existing roads. The weed control program is dynamic, due to new weed introduction and the ongoing implementation of varied control methods. Grazing and fire management, as well as chemical, mechanical, and biological control methods are used as part of an integrated weed management program. These methods are, of course, subject to site-specific determination of appropriate techniques. The BLM monitors, on an annual basis, the changes in distribution and new introductions of noxious weeds.

2.6.1 Andrews Management Unit

The Burns District has implemented an integrated weed management program on the Three Rivers RA and Andrews MU. The area under this assessment covers approximately 3.7 million acres. These lands are located primarily in Harney County with portions in Grant, Lake, and Malheur Counties.

The increase in noxious weeds and their impacts on local lands and resources are concerns for land managers and the public. New invasions of noxious weeds and the spread of established infestations are threatening the productivity of public land. Management of noxious weeds is important for maintenance of healthy ecosystems. See Table 2.4 for the complete list of noxious weeds known to occur in the Planning Area.

2.6.2 Steens Mountain Cooperative Management and Protection Area

Noxious weeds have become established in the Steens Mountain CMPA primarily because of vehicle use. Most of the weeds are located along the main roads. Infestations are treated using herbicide or excavated with hand tools. The most difficult weeds to control are Canada thistle, Scotch thistle, and bull thistle because they have spread over such a large area. Other noxious weeds found in the area are Mediterranean sage, diffuse knapweed, spotted knapweed, medusahead rye, and dalmation toadflax.

2.7 Riparian Resources

Riparian areas are water-dependant ecosystems bordering streams, rivers, and wetlands. They form ecological links between the terrestrial and aquatic components of the landscape. Riparian landform (flood plain), and vegetation and/or other structural components, such as woody debris and boulders, dissipate stream energy or wave action (standing water) during high water events and reduce erosion. Detention

and storage of high flows reduce flood risks and contribute inflow during periods of receding water surface elevation or flow. Reduced bank erosion contributes to maintenance of water quality and general riparian integrity. Riparian communities tend to be more diverse than surrounding upland communities and support a greater variety of wildlife species. The habitat islands provided by springs are especially important in high desert ecosystems.

In the past, many riparian/wetland areas were degraded by uncontrolled uses. Any management activity that disturbs water, soil, or vegetation can potentially degrade riparian areas. Such activities include livestock grazing, road construction, timber harvest, mining, irrigation, and recreation. In addition, off-site activities can affect riparian areas by influencing the timing and amount of overland and subsurface flow of water, and subsequent movement of soils. Some past land use practices have resulted in riparian areas that 1) have inadequate vegetation to protect streambanks from erosion; 2) lack appropriate diverse vegetation that provides habitat for riparian dependent wildlife species; 3) contain incised channels that do not allow streams to dissipate flood energy and provide water storage; and 4) provide inadequate pools and shade for aquatic species.

Riparian areas may exhibit different levels of susceptibility to disturbance relative to landform. Confined canyons with moderate to high gradients have evolved under conditions of concentrated, high velocity stream flows. These are natural sediment and water transport reaches, and often rely on large, less mobile rock to dissipate energy. Access to these reaches by recreationists, domestic livestock and wild horses is limited, thereby reducing possible additional disturbance. These stream reaches tend to be more resilient to natural and anthropogenic disturbance. In contrast, wide, low gradient valleys are depositional areas composed of sediment that may be more easily transported by stream energy and subsequently more susceptible to erosion. These systems rely on a combination of attributes for system stability, including access to a flood plain, herbaceous and/or woody riparian vegetation, and structural features (rock or woody debris) to maintain stream channel and riparian integrity. These areas are more easily accessible by recreationists, domestic livestock and wild horses, and are more susceptible to disturbance.

Riparian vegetation depends on channel type, duration of water availability, soil type and depth, climate, and management history. Sedges, rushes, and sometimes willow and alder dominate streams with deeper soils and longer lasting water. Boulder dominated streams have pockets of vegetation where grass and shrubs are dominant. As water availability decreases, herbaceous vegetation shifts from sedges to grasses. Alder, aspen, and willow are often the predominant woody vegetation in lower elevation sites. Higher sites are dominated by aspen.

Channel type determines the role played by vegetation in stream condition. Certain channel types are dependent upon vegetation to protect the stream banks in high flow events. The structure and type of vegetation are also critical to wildlife and fish. Trees such as aspen, cottonwoods, and some taller willows supply vertical structure for neotropical birds. As trees become old and decayed, they provide habitat for cavity nesters. The tree structures also supply shade to the stream, which may moderate water temperature by reducing the rate of heating. Leaves from deciduous species supply nutrients to the riparian and aquatic system, providing a food source for aquatic macroinvertebrates, and consequently for the fish which feed on them. Many cottonwood and aspen stands have declined in the resource area due to a number of factors including changes in stream channel morphology, lack of fire or other rejuvenating disturbances, and invasion by western juniper. Aspen need regular, periodic disturbance in order to regenerate and maintain their stands. Remnant stands can be found that are dying and have little or no regeneration. In order to regenerate, cottonwoods need flood events to deposit seeds in fine sediments and to provide water for the roots. After establishment, seedlings of cottonwood and aspen are highly susceptible to browse by domestic and wild ungulates.

Not all potentially disturbing activities are incompatible with riparian area recovery or management, and not all riparian areas are equally susceptible to degradation. For example, livestock management that adjusts the timing and duration of grazing in riparian areas allows for improvement of riparian vegetation and development of streambanks and floodplains. The application of management practices needs to address requirements for a self-sustaining riparian system, such as adequate diversity and composition of riparian vegetation within the capabilities of the system or stream reach. Functional riparian systems maintain stream channel stability and facilitate a variety of environmental, social, and economic values, such as clean water, fish and wildlife habitat, livestock forage, and scenic quality.

Most management focus has been on streamside or running water riparian areas, although other types of riparian areas exist that are associated with standing

water. These include lakeshore, marshes, swamps, wet meadows, wetlands, and areas with seeps and springs. These features are inundated or saturated by surface or ground water and support a predominance of vegetation adapted to saturated soil conditions. PFC assessment and field-verified quantification of these types of riparian areas have not been done, although the locations of most of them are known.

Proper Functioning Condition (PFC) and Riparian Condition and Trend are two different methods used to evaluate the condition of riparian areas in the Planning Area. Both methods address physical and biological attributes, although to varying degrees. Assessments were conducted almost exclusively along perennial streams.

The PFC Assessment (BLM 1993a) emphasizes the physical function of the stream channel and riparian area evaluated through an interdisciplinary team approach, and is based on the system's capability and potential. The assessment concludes with one of the following categories as defined:

The PFC of a riparian/wetland area contains adequate vegetation, landform, or large woody debris to do the following:

- dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality;
- filter sediment, capture bedload, and aid in floodplain development;
- improve flood-water retention and ground-water recharge;
- develop root masses that stabilize streambanks against cutting action;
- develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and
- support greater biodiversity.

Functional at Risk (FAR) – riparian/wetland area that possesses some or even most of the elements listed in the PFC definition, but at least one of its attributes/processes gives it a high probability of degradation at a relatively high flow event(s)such as five-, ten-, and 20-year events. Trend must be determined, if possible, under this category and denoted as upward, downward, or not apparent.

Non-Functioning – riparian/wetland area clearly lacks the elements listed in the PFC definition.

Riparian/wetland areas will function properly before they achieve an advanced ecological status or a theoretical "desired future condition." The range between PFC and an area's physical and biological potential becomes the "decision space" for social, economic, and other resource considerations. PFC assessments were conducted primarily from 1998 to 2000 and constitute the most up to date riparian resource evaluation and trend for the project area (Figure 2.5).

Riparian Condition and Trend ratings were obtained by assessing the physical and biological characteristics of the stream channel and riparian area based on a variety of studies and evaluations. Evaluation factors may include percent of stream shade, riparian vegetation composition, vigor and abundance of riparian plant composition, age class of riparian plants, stream bank stability, amount of stream meandering, stream gradient, and bank rock content. The assessment concludes with one of the following categories as defined, and a relative trend of Upward, Downward or Static:

Excellent Condition: Shading streambank cover exceeds 50 percent. Understory species and shade providing species are vigorous, with a mixture of age classes. More than 90 percent of streambanks are stable.

Good Condition: Shading streambank cover and understory species are usually reduced from the level found in habitat that is in excellent condition. More than 80 percent of streambanks are stable. A variety of age classes and forms are still present.

Fair Condition: Streambank plant species are noticeably reduced in diversity, reproduction, and productivity relative to habitat in good or excellent condition. Shading streambank cover is usually less than 20 percent. Many streambanks are unstable, with some vegetation healing of eroded banks. Riparian shrubs and trees are present.

Poor Condition: Typical riparian plant species are missing or sparse. Shading streambank cover is commonly 0 to ten percent. Most erodible banks are unstable, with little healing by vegetation. The stream may be downcut due to erosion. Habitat does not have a variety of species and forms that provide cover, shade, and forage for many wildlife species. The riparian area is often narrow and limited relative to potential. Woody riparian species may be sparse or absent.

Riparian Condition and Trend ratings were compiled in 1996. This assessment was primarily based on surveys conducted in 1979 and 1991. An interdisciplinary team approach was not used for this assessment.

2.7.1 Andrews Management Unit

The PFC Assessment for the streams surveyed in the Andrews MU is as follows: 67 percent PFC, 26 percent FAR and seven percent nonfunctioning.

The riparian habitat on public land in the Andrews MU represents a variety of habitat conditions as follows: Approximately 13.1 percent is in excellent condition; Approximately 21 percent is in good condition; approximately 37 percent is in fair condition; approximately 17.7 percent is in poor condition; and 11.3 percent of the area condition is unknown. These numbers are based on surveyed streams and GIS estimations, which will be updated for the RMP/EIS.

2.7.2 Steens Mountain Cooperative Management and Protection Area

The approximate PFC Assessment for the streams surveyed in the Steens Mountain CMPA is as follows: 75 percent PFC, 23 percent FAR and two percent nonfunctioning.

2.8 Grazing Management

2.8.1 Andrews Management Unit

2.8.1.1 Regulatory Context

Three laws provide the nationwide legal context for the management of grazing on public lands. The Taylor Grazing Act was passed on June 28, 1934, to protect public land resources from degradation and also to provide orderly use and improvement/development of public rangelands. Following various homestead acts, the Taylor Grazing Act established a system for the allotment of grazing privileges to livestock operators based on grazing capacity and priority of use, and for the delineation of allotment boundaries. It also established standards for rangeland improvements and implemented grazing fees. Approximately 142 million acres of land in the western United States were placed under the jurisdiction of the Grazing Service, which became the BLM in 1946. The Federal Land Policy and Management Act (FLPMA) passed in 1976, and the Public Rangelands Improvement Act (PRIA) passed in 1978, also provide authority for the management of livestock grazing on public lands.

2.8.1.2 Rangeland Standards and Condition

The rangeland reform process of 1996 modified the grazing regulations identified in 43 CFR part 4100. A new regulation was developed and is currently being implemented throughout the BLM. The regulation, 43 CFR 4180, addresses the fundamentals of rangeland health. The Standards for Rangeland Health and Guidelines for Livestock Grazing Management (BLM 1997a) provide the basis for assessing rangeland conditions and trends. In August 1997, the standards and guidelines developed in consultation with the Southeast Oregon Resource Advisory Council (RAC), Provincial Advisory Committees, Native Americans, and others, were approved by the Oregon State Director for Oregon and Washington. Figure 2.6 illustrates range conditions in the Planning Area.

Specific types of field indicators of rangeland health are identified for each standard. The quantitative thresholds for these indicators vary according to soil, climate, and landform, as stated in the standards. An interdisciplinary team, with participation from permittees and other interested parties, conducts assessments to evaluate the standards according to field indicators. The five standards are as follows:

Standard 1: Watershed Function - Uplands
Upland soils exhibit infiltration and permeability rates, moisture storage and stability appropriate to soil, climate, and land form.

Standard 2: Watershed Function - Riparian/Wetland areas
Riparian/wetland areas are in properly functioning physical condition appropriate to soil, climate, and land form.

Standard 3: Ecological Processes
Healthy, productive, and diverse plant and animal populations and communities appropriate to soil, climate, and landform are supported by ecological processes of nutrient cycling, energy flow, and the hydrologic cycle.

Standard 4: Water Quality
Surface water and ground water quality influenced by agency actions complies with state water quality standards.

Standard 5: Native, Threatened and Endangered and Locally Important Species
Habitats support healthy, productive, and diverse populations and communities of native plants and animals (including special status species and species of

local importance) appropriate to soil, climate, and landform.

Based on 43 CFR part 4180, in the event that livestock are detrimental to a resource standard, management will be implemented as soon as practical to ensure that progress is made toward attaining the standard(s). This will occur no later than the start of the next grazing season.

Collection of monitoring data keeps track of progress in meeting identified management objectives. The monitoring data is used for periodic evaluations of management actions and active grazing authorizations in each allotment. To maintain or improve public land resources, adjustments are made by agreement or decision in accordance with legislation, regulations, and policy.

Prior to the 1960s, grazing policy focused on allotment boundaries and seasons of use; however, in the mid-1960s, grazing systems were implemented which considered the maintenance and establishment of plant communities. Grazing systems define the management approach needed for each allotment to protect and maintain plant community diversity and the resource values on public land. Livestock grazing allotments are categorized and managed according to the three following selective management categories:

Improve (I) category allotments are managed to improve current unsatisfactory resource conditions and will receive the highest priority for funding and management actions.

Maintain (M) category allotments are managed to maintain current satisfactory resource conditions and will be actively managed to ensure that resource values do not decline.

Custodial (C) category allotments include a high percentage of private lands and are managed custodially while protecting existing resource values.

2.8.1.3 Regional Context

Specific objectives and actions intended to implement the nationwide policies summarized above are provided by the Andrews MFP (BLM 1982a), the SEORMP (BLM 1995a) and the Act. A significant element of the Act was the creation of a No Livestock Grazing Area of over 97,000 acres. Implementation of this provision is discussed below.

Livestock grazing will continue in the Steens Mountain CMPA where allowed under the Act and will conform to applicable laws, policy, and BLM regulations including the Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands in Oregon and Washington (August 1997a). Grazing management will be guided by the Act, current land use plans, Andrews MFP (1982a), and the Three Rivers RMP (1992a).

Recent land use plans have developed and implemented grazing systems primarily through Allotment Management Plans (AMPs) and agreements with permittees. An AMP is a documented program that directs grazing management on specified public land toward reaching goals regarding resource conditions, sustained yield, multiple use, and ranch economics. AMPs are considered to be implemented when incorporated into term grazing permits or leases and when accepted by the permittee or lessee. The RMP/EIS will reestablish resource objectives which all allotments must meet. Specific management prescriptions will still be made on an allotment or watershed basis.

2.8.1.4 Current Grazing

Summary of Allotments

Thirty-five permittees are authorized to graze livestock on 72 allotments in the Planning Area. Allotment boundaries are illustrated on Figure 2.7 and the allotment characteristics (name, size, animal unit months [AUMs], season of use and management categories) are presented in Table 2.5 for the combined Andrews MU and Steens Mountain CMPA area. Many of the allotments in the Planning Area overlap; therefore, the data is presented in this single table with Planning Area location noted.

Grazing exclusions

The No Livestock Grazing Area (97,671 acres) designated by the Act altered the previous pattern of use through land exchanges and amendments to individual allotments and created the first Congressionally designated cattle free wilderness of its kind. Land exchanges conducted to meet the mandates of the Act necessitated allotment boundary changes, revisions to AUMs, and several rangeland improvement projects.

Additional areas within livestock grazing allotments are excluded from grazing as determined in prior decisions and agreements between the BLM and permittees. Exclusionary measures are utilized to protect resource values and facilities. The types of resources and facilities protected by the exclusion of livestock grazing

Table 2.5: Allotment Characteristics in the Planning Area

Number	Allotment Name	Size (Total Acres)	Total AUMs	Season of Use	Management Category	Planning Area
5309	Happy Valley	3,917	304		M	Steens
5310	Riddle Mountain	4,714	789		I	Steens
5327	Jenkins B Flat FFR	1,034	283		C	Steens
5329	Riddle/Coyote	1,646	300		I	Steens
5331	Smyth-Kiger	12,819	714		I	Steens
5604	Burnt Flat	28,260	3,224		I	Steens
6001	North Catlow	190,803	3,704	Multiple	I	Andrews
6002	South Steens	90,988	9,577	Multiple	I	Steens
6005	Mud Creek	8,245	590	Spring	I	Steens
6006	Frazier Field	20,600	1,906	Multiple	I	Steens
6007	Ruby Springs	15,439	1,928	Multiple	I	Steens
6008	Krumbo	16,224	4,133	Multiple	M	And/Stns
6010	East Ridge	8,864	431	Multiple	I	And/Stns
6011	Pollock	87,107	4,107	Multiple	I	And/Stns
6012	Alvord	223,136	8,923	Multiple	I	And/Stns
6014	Tumtum	8,080	730	Winter	M	Andrews
6015	Trout Creek Mountain	93,825	8,852	Multiple	I	Andrews
6016	Sandhills	12,547	1,583	Multiple	M	Andrews
6017	Grassy Basin	5,819	556	Multiple	M	Andrews
6018	Tule Springs	148,469	5,506	Winter	I	Andrews
6019	Serrano Point	14,942	500	Spring	I	And/Stns
6020	Pueblo-Lone Mountain	272,481	17,964	Multiple	I	Andrews
6021	Pueblo Mountain	8,789	323	Multiple	I	Andrews
6022	Kings River	1,771	113	Summer	I	Andrews
6023	Hammond	13,719	473	Spring	I	Andrews
6024	South Fork	476	40	Spring	M	Andrews
6025	Hardie Summer	6,126	408	Summer	I	Steens
6026	Mann Lake	36,822	3,670	Multiple	I	And/Stns
6027	Carlson Creek	12,894	684	Spring	I	Steens
6028	Fields	5,029	210	Multiple	I+	Andrews
6029	Keg Springs	41,163	1,791	Summer	I	Andrews

Number	Allotment Name	Size (Total Acres)	Total AUMs	Season of Use	Management Category	Planning Area
6030	Reicken's Corner	9,841	688	Multiple	M	Andrews
6031	LaVoy Tables	43,404	2,373	Multiple	I	And/Stns
6032	Krumbo Mountain	17,359	1,059	Summer	I	Steens
6033	Chimney	24,893	2,015	Multiple	I	Steens
6035	Fields Basin	32,742	3,506	Multiple	I	Andrews
6037	Bridge Creek	3,659	0	Multiple	I	Steens
6038	Alvord Peak	25,063	2,336	Multiple	I	And/Stns
6040	Stonehouse	10,838	1,772	Summer	I	Steens
6041	South Catlow	62,132	2,100	Multiple	I	Andrews
6100	Hammond FFR	7,317	32	Spring	C	Andrews
6101	Waldkirch FFR	351	12	Winter	C	Andrews
6102	Oregon End FFR	2,497	138	Spring	C	Andrews
6103	Wiley FFR	1,174	6	Spring	C	Andrews
6104	Defenbaugh FFR	3,853	60	Spring	C	Andrews
6105	Wrench Ranch FFR	3,925	51	Fall	C	Andrews
6106	Orlando FFR	8,428	320	Summer	C	Andrews
6107	Crump/ Calderwood FFR	1,630	12	Spring	C	Andrews
6108	Henricks FFR	1,001	30	Fall	C	Andrews
6109	Casey FFR	619	21	Multiple	C	Andrews
6110	Still FFR	3,296	68	Winter	C	Andrews
6111	Dunbar FFR	2,546	68	Multiple	C	Andrews
6112	Long Hollow FFR	1,664	103	Multiple	C	Andrews
6114	Rock Creek FFR	10,811	148	Summer	C	Andrews
6115	Dixon FFR	1,241	22	Fall	C	Andrews
6116	Northrop FFR	2,599	40	Fall	C	Andrews
6117	Kaser FFR	1,618	5	Summer	C	Andrews
6118	Lupher FFR	210	21	Spring	C	Andrews
6119	Pollock FFR	6,124	19	Multiple	C	Andrews
6120	Mann Lake FFR	28,085	22	Summer	C	Andrews
6121	Neuschwander FFR	2,010	43	Spring	C	Andrews
6122	Starr FFR	778	9	Spring	C	Andrews
6123	Clover Swale FFR	3,238	0	Spring	C	Andrews
6124	Windmill FFR	841	15	Fall	C	Andrews

Number	Allotment Name	Size (Total Acres)	Total AUMs	Season of Use	Management Category	Planning Area
6125	Roaring Springs FFR	202,309	343	Multiple	C	Andrews
6126	McCoy Creek	14,079	151	Summer	C	Steens
6127	Kueny Ranch FFR	11,720	35	Spring	C	Andrews
6128	Konek FFR	365	10	Spring	C	Andrews
6129	Alvord FFR	18,277	0	Multiple	C	Andrews
6130	Scharff FFR	5,076	68	Summer	C	Steens
6131	South Pocket FFR	146	1	Fall	C	Andrews
6133	Otley Brothers FFR	8,995	21	Summer	C	Steens

Table 2.6: Rangeland Condition in the Andrews MU

Rangeland Health Class	Acreage	Percentage of Total
Excellent	15,183	1
Good	276,577	23
Mixed good/fair	163,604	13
Mixed good/poor	20,338	2
Fair	585,369	48
Mixed fair/poor	37,042	3
Poor	66,722	5.5
Rock	2,284	0.5
No Data	54,192	4
TOTAL	**1,221,311**	**100**

include the following: riparian vegetation communities; reservoirs, springs and wetlands; developed water sources; special status plant or animal habitats; relevant and important values for which ACECs) are designated; Outstandingly Remarkable Values (ORVs) for which WSRs were designated; wilderness values; research and study plots; administrative sites; recreation sites; and archeological sites.

Rangeland Condition

Ecological Site Inventory (ESI) data describe the condition of vegetative communities based on soil characteristics and potential natural vegetative community. ESI data from approximately 1984 to 1992 are provided for the Andrews MU. The condition of the rangelands in the Andrews MU is summarized in Table 2.6 and depicted on Figure 2.6. Some areas are not represented in the table because they are either predominated by rock or no data exist, as in the case of private lands and Malheur National Wildlife Refuge lands.

Within the Planning Area, there are 32 improve "I" category allotments, seven maintain "M" category allotments and 33 custodial "C" category allotments.

Within allotments containing riparian habitat and water quality values, improved grazing management is a priority for the Andrews MU. To date, allotments with significant riparian resource values and updated management plans have shown improvement in condition and trend.

2.8.1.5 Rangeland Improvements

In order to better manage livestock distribution and rangeland, the following tasks have been completed: brush control and rangeland seeding; structural improvements to fences; cattleguards; reservoirs; spring developments; wells; and pipelines (Figure 2.8). As mandated in FLPMA and in PRIA, a portion of grazing fees is to be used on range improvements for the benefit of wildlife, watersheds, and livestock producers. Emergency fire rehabilitation funds have also been expended to protect resource values or to restore exotic annual vegetative community types to a perennial plant community in order to improve plant community and watershed health. Livestock operators, state and federal agencies and other interested groups have also continued to fund construction of rangeland improvement projects. On April 25, 2001, the Burns DO released for public comment the Finding of No Significant Impact for the Projects for Implementation of the Steens Mountain CMPA and EA OR-027-01-27 (BLM 2001a). The EA proposed many projects including the following: building new fences and water holes, installing cattleguards, pipelines and water troughs, drilling wells, and developing or maintaining springs. The fencing and water system projects will implement the No Livestock Grazing Area, achieve replacement forage objectives contained in the Act, and provide for management on the allotments which have a reduced land base due to the creation of the No Livestock Grazing Area. All of the completed and proposed actions are in conformance with the Act as directed in the various sections. Projects not directly mentioned in the Act are in conformance with the Andrews MFP and the Andrews Rangeland Program Summary update. Table 2.7 lists the types and sizes of the improvements and state of completion or planning.

2.8.2 Steens Mountain Cooperative Management and Protection Area

In order to implement the No Livestock Grazing Area created by the Act, the BLM retired grazing permits in whole or part, constructed protective fencing, and constructed fences and water developments to provide for the replacement forage designated in the Act. Adjustments in allotment boundaries, ten year permits, and grazing preference associated with the above referenced sections of the Act were implemented only to reflect the changes created by the Act. The entire No Livestock Grazing Area is located within the Steens Mountain CMPA boundary; therefore, the majority of allotment revisions and improvement projects have been carried out in the Steens Mountain CMPA and Steens Mountain Wilderness. All or a portion of 27 remaining allotments are located in the Steens Mountain CMPA, and are operated by 17 permittees.

2.8.2.1 Rangeland Health

Rangeland condition within the Steens Mountain CMPA is summarized in Table 2.8. Some areas are not represented in the table because they are either predominated by rock or no data exist, as in the case of private and Malheur National Wildlife Refuge lands.

2.8.2.2 Rangeland Improvements

Range improvements planned prior to legislation which have completed NEPA documentation and are in conformance with the Act may still be implemented within the Steens Mountain CMPA. New range improvements as previously discussed and necessary to fully implement the No Livestock Grazing Area and other legislated grazing changes, may be constructed following NEPA analysis. Additional range improvements will be coordinated through the SMAC to obtain its input regarding the need for such improvements to meet the requirements and purpose of the Steens Mountain CMPA.

Maintenance and reconstruction of existing support facilities in the Steens Mountain Wilderness and Wilderness Study Areas (WSAs) will be in accordance with existing guidelines for wilderness, WSAs, NEPA, and the Act. Maintenance, reconstruction, and construction of new support facilities in wilderness areas where grazing is allowed, as well as access for these and other purposes, will be in compliance with the Wilderness Act and House Report 101-405 (Arizona Desert Wilderness Act) grazing guidelines. In WSAs, maintenance, reconstruction, new construction and access to livestock facilities will be in compliance with the Interim Management Policy For Lands Under Wilderness Review (BLM Manual H-8550-1).

2.9 Animal Damage Control

Animal damage control is an activity of the United States Department of Agriculture (USDA)- Agricultural Plant and Animal Health Inspection Service (APHIS). This activity is authorized by federal law under the Animal Damage Control Act (7 USC 426-426b) and by Oregon State Law under Oregon Revised Statute (ORS) 610.105, authority to Control Noxious Rodents or Predatory Animals.

The roles and responsibilities of the BLM and USDA-APHIS are specified under a National Memorandum of Understanding (MOU) between the BLM and USDA-

Table 2.7: Range Improvement Information for the Planning Area

Improvement	Size/Level	Date Completed/Planned
Miner's Field South fence	3.5 miles	2002
Eusabio Ridge Fence	7.0 miles	2002
Straw Hat Pass Fence	1.0 miles	2002
Burnt Car Fence	.75 miles	2002
Bradeen Crossing Fence	.5 miles	2002
Tombstone Fence Extension	3.0 miles	2002
North Catlow Boundary Fence	6.0 miles	2002
North Catlow Winter Pasture Fence	6.5 miles	2002
O'Keefe Pipeline	4.0 miles	2002
Burke Springs Pipeline Extension	0.5 miles	2002
North Catlow Pipeline	4.0 miles	2002
South Andrews Spring Reconstruction	2 each	2002
Cattleguards	5 each	2002
Waterholes	4 each	2002
O'Keefe Well	1 each	2002

Table 2.8: Rangeland Condition within the Steens Mountain CMPA

Rangeland health class	Acreage	Percent of Total
Excellent	17,629	4
Good	129,210	30
Mixed good/fair	76,831	18
Mixed good/poor	1,540	0.5
Fair	161,371	38
Mixed fair/poor	7,571	1.5
Poor	9,487	2
Rock	20,791	5
No Data	4,083	1
TOTAL	**428,513**	**100**

Table 2.9: Major Subbasins in the Andrews Management Unit

Subbasin	HUC	Total Acres[1]	USFWS	State Acres	Private Acres	AMU BLM Acres	AMU Stream Miles[2]
Guano	17120008	625,014	0	658	271,813	352,544	1,061
Harney/Malheur Lakes	17120001	2,567	0	0	14	2,553	5
Alvord Lake	17120009	748,442	0	5,595	117,946	624,901	2,258
Donner und Blitzen	17120003	86,405	26,677	30	35,011	24,688	284
Thousand-Virgin	16040205	171,333	0	0	2,055	169,278	597
Crooked-Rattlesnake	17050109	45,071	0	0	0	45,071	219
Total		**1,678,832**	**26,677**	**6,283**	**426,839**	**1,219,035**	**4,424**

[1] The total acres value covers the subbasin area within the Andrews MU.
[2] The stream miles include all perennial, intermittent and ephemeral streams within the Andrews MU (excluding the Steens Mountain CMPA). There are approximately 430 miles of perennial streams in the Andrews MU.

APHIS which was signed on March 21, 1995. According to this memorandum, USDA-APHIS is responsible for environmental analysis documents associated with their control actions on public land. The BLM identifies human safety areas or other resource management concerns where actions are proposed; therefore, this program will not be analyzed further. Areas of animal damage control activity are identified to the BLM on an annual basis.

2.10 Water Resources

2.10.1 Andrews Management Unit

The Andrews MU contains portions or all of six subbasins: Guano, Harney/Malheur Lakes, Alvord Lake, Donner und Blitzen, Thousand-Virgin, and Crooked-Rattlesnake. These subbasins comprise the subbasin review area for the Andrews MU. The entire Andrews MU is within these six subbasins and is within an internally drained watershed, with the exception of the Crooked-Rattlesnake subbasin on the eastern edge of the Andrews MU, which drains to the Columbia River via the Owyhee River. The topographic features of these large areas direct surface and some shallow subsurface water to streams, rivers, lakes, reservoirs or playas. The hydrographic subbasins are displayed on Figure 2.9. The major portions of the Andrews MU (subbasins Guano, Harney/Malheur Lakes, Alvord Lake, and Donner und Blitzen) are part of the larger Oregon Closed Basins Subregion and the Pacific Northwest Region. The eastern portion of the Andrews MU (Crooked-Rattlesnake subbasin) is part of the Middle Snake Subregion and the Pacific Northwest Region. The southwest portion of the Andrews MU (Thousand-Virgin subbasin) is part of the Black Rock Desert-Humboldt Region and the Great Basin Region. Regions, subregions, basins and subbasins are delineated based on protocol defined by the USGS. This system delineates a hierarchy of geographical regions and their sub-parts, such as subregion, basin, subbasin, watershed and subwatershed. Each hydrologic unit is referred to as a field and given a two-digit numeric identifier. The code, called a HUC, is a unique numeric identifier. Table 2.9 describes the major subbasins in the Andrews MU. The Guano subbasin contains several reservoirs and lakes that are within the Andrews MU. These reservoirs include Guano, Rock Creek, Three Mile, Skull Creek and Walls Lake. Also in the Guano subbasin and the Andrews MU are Tucke, Lost, Savoy, Walls, Little Walls, West Field, V, Sixmile, Garrison, Bradley, and Sickey Lakes. The Alvord Lake subbasin contains several reservoirs and lakes that are within the Andrews MU. The reservoirs include East Table Mountain, North Table Mountain, West Table Mountain, Mickey, and Lower Borax Lake. The lakes include Alvord, Borax, Tumtum, Coyote, No Name, Tudor, Juniper, Alvord Desert, and Heath. The Donner und Blitzen subbasin includes several reservoirs, lakes and a portion of the Donner und Blitzen River system that is within the Andrews MU. The reservoirs include Krumbo, Kern, and Larkspur. The lakes include Baca, Five Mile, and Marshall. The Donner und Blitzen River system flows north from the Steens Mountain CMPA into this subbasin and then into the Harney/Malheur Lake subbasin north of the

Andrews MU. The Harney/Malheur Lake subbasin does not include any reservoirs or lakes within the Andrews MU. The Thousand-Virgin subbasin includes one reservoir, Oregon End, within the Andrews MU. The Crooked-Rattlesnake subbasin includes three reservoirs (Wildcat, Bob Cat, and Steel Post) within the Andrews MU. The primary drainage in this subbasin is Wildcat Creek, which flows east out of the Andrews MU into Rattlesnake Creek and then into the Owyhee River.

2.10.1.1 Streams

The streams in the subbasin review area originate in the higher elevation hills and mountains. They then flow to the lower elevation valleys, lakes, rivers, wetlands, and playas. The table listing major streams within the Andrews MU is included in the Riparian Resources Section of this document (Section 2.7). Most surface runoff is from snowmelt or rainfall at the higher elevations, producing peak discharges in the spring and early summer. The intensity of runoff influences streamflow quantity and duration. The scarcity of water has led to increased water storage, water diversions, and ground water withdrawal associated with irrigation of hay fields, improved pastures, and rangeland improvements. Projects developed for irrigation, livestock, human use, and flood control have significantly altered natural flow regimes. This in turn has altered habitat conditions, channel stability, and timing of sediment and organic material transport. Streamflow has also been altered by management activities such as water impoundments, water withdrawal, road construction, vegetation manipulation, fire suppression, and grazing.

Many of the streams in lower-elevation semiarid areas are either intermittent, with segments of perennial flow near springs, or ephemeral, with flow only during spring runoff and intense summer storms. These drainages are often characterized by straight channels with erosion in the upper reaches and deposition in the lower reaches. The channels are often deeply incised, with steep banks that slough and develop new headcuts perpendicular to the main stream. Water in intermittent streams and ephemeral drainages may infiltrate into the channel or it may evaporate. Intermittent streams have surface flows for part but not all of the year, or flows which are subsurface for a section of the stream. These streams are in contact with the water table and either receive water from the ground water system to surface flow or provide surface water to the ground water table. Ephemeral drainages are channels in which surface water flows immediately after snowmelt or rain fall. They are always above the water table.

The functional aspects of streams and riparian resources/habitat were previously covered in the Riparian Resources Section of this document (Section 2.7).

2.10.1.2 Surface Water Quality

The Environmental Protection Agency (EPA) delegated to the Oregon Department of Environmental Quality (ODEQ) the authority to implement, in Oregon, the Federal Water Pollution Control Act of 1972 (FWPCA) and amendments (Clean Water Act 1977). As specified in the FWPCA and subsequent amendments, federal agencies are responsible for water quality on lands they manage. This responsibility is outlined in Memorandums of Agreement (MOAs) with state environmental agencies. These MOAs require federal agencies to do the following: 1) implement and enforce natural resource management programs for the protection of water quality on federal lands under federal jurisdiction; 2) meet water quality standards, monitor activities to assure that they meet standards, and report the results to the State of Oregon; and 3) meet periodically to recertify water quality Best Management Practices (BMPs). Water quality BMPs are those practices designed to prevent or reduce water pollution from nonpoint sources and unidentified or indirect sources (silt fences, straw bales, and rice wattles). The BMPs also include the management of soil, water, and land uses.

As specified in the FWPCA, water quality involves all factors that affect existing and designated uses of a body of water. Designated uses include recreation, hydropower, water supply, and maintenance of fisheries and riparian habitats. The primary cause of water quality degradation on public land is nonpoint source pollution. Elevated stream temperatures, sediment, bacteria from warm blooded animals, and turbidity levels are the primary water quality problems stemming from nonpoint source pollution.

To meet the requirements of the Clean Water Act, the State of Oregon produced the 1988 Oregon Statewide Assessment of Nonpoint Sources of Water Pollution Report. The report identified waters affected by nonpoint source pollution, categories of nonpoint source pollution, the process for identifying BMPs, and state and local nonpoint source programs. The report also listed stream segments with moderate to severe water quality issues impacting desired beneficial uses. Approximately 45 percent of the stream miles examined were identified as either having no nonpoint source-related water quality problems, or inadequate data to make a determination. Many reaches exhibited

Table 2.10: Water Quality Limited Streams within the Andrews Management Unit

Stream Name	Parameter	Segment	Sources
Harney/Malheur Lake Subbasin			
Riddle Creek	Temperature-Summer	Mouth to Headwaters	BLM Data (1993)
Donner und Blitzen River Subbasin			
Deep Creek	Temperature-Summer	Mouth to Headwaters	BLM (1996-1997)
Guano Subbasin			
Home Creek	Temperature-Summer	Mouth to Headwaters	BLM Data (1995-1997)
Skull Creek	Temperature-Summer	Mouth to Headwaters	BLM Data (1995-1997)
Alvord Lake Subbasin			
Denio Creek	Temperature-Summer	Mouth to Headwaters	BLM Data (1995-1997)
Little Trout Creek	Temperature-Summer	Mouth to Headwaters	ODFW Data (1994)
Little Whitehorse Creek	Temperature-Summer	Mouth to Headwaters	ODFW Data (1992-1994)
Trout Creek	Temperature-Summer	Mouth to Headwaters	ODFW Data (1994)
Trout Creek East Fork	Temperature-Summer	Mouth to Headwaters	ODFW Data (1994)
Van Horn Creek	Temperature-Summer	Mouth to Headwaters	BLM (1995-1997)
Willow Creek (Trout Creek Mountains)	Temperature-Summer	Mouth to Headwaters	ODFW Data (1992-1994)
Willow Creek (Steens Mountain)	Temperature-Summer	Mouth to Canyon	BLM (1996)

nonpoint source pollution problems that affect beneficial uses such as fisheries, aquatic habitat, wildlife habitat, and water contact recreation.

Major causes of degradation cited in the report were the presence of animal waste, surface erosion, sedimentation, and the removal of riparian vegetation and stream channel thermal cover. Land uses which correlated with these problems were grazing, mining, and road construction. Additional land use problems identified were human and animal traffic (roads and trails), water withdrawal, reservoir storage and release, altered physical characteristics of the stream, and channelization or drainage of wetlands. The report identified many reaches with elevated stream temperatures, turbidity, nutrient loading, sediment, and low dissolved oxygen levels and flow volumes.

To fulfil some of the EPA Section 303(d) requirements, the State of Oregon updated its list of "water quality limited" waters in 1998 with additional updates to come out in 2002. Table 2.10 lists the streams in the Andrews MU which are 303(d) water quality limited streams.

There are no 303(d) listed streams within the Planning Area portion of Thousand-Virgin and the Crooked Rattlesnake subbasins.

The State of Oregon has established beneficial uses for the surface and ground water within the analysis area and water quality standards which protect these uses. The state designates beneficial uses at the basin level rather than the subbasin level. The Guano, Harney/Malheur Lakes, Alvord Lake, and Donner und Blitzen portions of the subbasin analysis area are within the Oregon Closed Basins Basin. The Thousand-Virgin portion of the subbasin analysis area is within the Black Rock Desert Basin and the Crooked-Rattlesnake portion of the subbasin analysis area is within the Middle Snake Basin. The State of Oregon is required to identify which beneficial uses a waterbody currently supports or could support in the future. The primary surface water beneficial uses are domestic water supply, fisheries, irrigation, livestock watering, wildlife, hunting, fishing, recreation, and aesthetics. Most streams in the Andrews MU support the state designated beneficial uses. Elevated summer temperatures are the primary water

quality problem identified by the state for all 303(d) listed streams in the Andrews MU. While some stream measurements have been shown to violate the state standard for resident fish and aquatic life water temperature numeric criteria, it is not known if the natural temperature potential would meet the criteria.

2.10.1.3 Ground Water

The regional ground water gradients and extensive aquifer systems within the Andrews MU have not been studied. Ground water data are limited and are based on small isolated basin studies and well logs. The geology of the area is composed primarily of volcanic rocks. The water-bearing properties of these geologic formations depend largely on faults, fractures, joints, etc. The rate and quantity of ground water movement depends on the hydraulic conductivity of the geologic formation and the hydraulic gradient.

Ground water occurs as both confined and unconfined aquifer systems. Most unconfined aquifers are located in stream valleys or are associated with Pleistocene lakebeds that contain recent alluvial material; some may exist as perched aquifers. Alluvial aquifers vary greatly in size and yield from one stream/lakebed to another. These aquifers are important as transient storage systems to move ground water to or from streams and the deeper confined aquifers, and they are typical of drainages in the Planning Area. Perched aquifers occur along ridges between stream valleys and can usually be identified by the occurrence of springs above the valley bottoms. They are often associated with alluvial aquifers where streambeds intersect permeable outcrop areas.

Little is known of the areal extent or depth of the deep, confined bedrock aquifer systems. The ODEQ has not identified any sole-source aquifers. Numerous volcanic flows and faults confound the concept of a uniform regional ground water gradient. Recharge to ground water systems occurs mainly at higher elevations where precipitation significantly exceeds evapotranspiration. Precipitation is the major recharge source in areas with an exposed permeable formation and average annual precipitation in excess of 12 inches.

Ground water is used for domestic and livestock purposes and for irrigation. Ground water quality depends on the chemical makeup of the water-bearing formation. Most of the region contains good quality water, but the water is usually hard and contains moderate amounts of dissolved minerals. Minor exceptions are geothermal and hydrothermal waters that have concentrated elements such as arsenic, mercury, molybdenum, uranium, and selenium (Ferns et al. 1993). There are no potable water wells on public land in the Andrews MU. Springs and seeps occur in areas where water from aquifers reaches the surface. Many springs begin in stream channels; others flow into small ponds or marshy areas that drain into channels. Some springs and seep areas form their own channels that reach flowing streams, but other springs lose their surface expression and recharge alluvial fill material or permeable stratum. Inflow from riparian/hyporheic zones impacts baseflows and associated water temperature buffering and moderation.

Water from springs differs from that of overland runoff in that it is generally more constant in temperature and lower in dissolved oxygen, especially close to the source. Mineral content in water varies from spring to spring along stream courses depending upon the geochemistry of the substrata through which it flows.

2.10.1.4 Wetlands

Wetlands are lakes, reservoirs, playas, sloughs, meadows, springs, and seeps that are permanently or seasonally covered with water. They are found throughout various elevations and landscape settings. This is particularly true for meadows, springs, and seeps that may be present within very high areas and at lower elevations. Common plant species in wetland, seep, and spring areas include salt grass, Baltic rush, spikerush, and cattail. The intensity of wildlife use of these areas is seasonally variable. Many waterfowl and shorebird species use these areas during spring and fall migrations, but resident species predominate in summer. Seasonal playas may contain aquatic invertebrates that are able to survive periods of desiccation.

The United States Army Corps of Engineers (USACE), EPA, USFWS, and Natural Resources Conservation Service (NRCS) worked together to develop common language and criteria for the identification and delineation of wetlands in the United States. These agencies defined wetlands as possessing three critical components: 1) hydrophytic vegetation, 2) hydric soils, and 3) wetland hydrology. Hydrophytic vegetation is defined as plant life growing in water, soil, or substrate that is at least periodically deficient in oxygen as a result of excess water content. Hydric soils are those that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic (without oxygen) conditions in the upper part of the soil profile. Generally, hydric soil is subject to water saturation at temperatures above freezing for at least a week during the growing season. Wetland hydrology is

defined as permanent or periodic inundation of water, or soil saturation to the surface.

Alvord Playa and Alvord Lake are large playas that frequently dry out. They are examples of seasonal wetlands that are dependent on precipitation and climatic conditions. Water levels have a strong influence on shoreline vegetation; however, the irrigation drawdown of some reservoirs is controlled by private water right users and is therefore not subject to BLM management.

Some of the most important meadow habitats are located at mid and upper elevations of complex mountainous terrain. Examples can be found in the Trout Creek and Pueblo Mountains in the Andrews MU. Gullies are present in some meadow areas, lowering the water table and thus reducing productivity and creating a situation favorable to invading plant species. A partial inventory of meadows on public land in the Pueblo Mountains conducted in 1984 (Burns District files, Pueblo-Lone Mountain Allotment [1984a]) found meadows mostly in poor to fair condition, with gullies up to four feet deep in four out of 15 meadows sampled. Big sagebrush has encroached on some meadows, reducing their extent and productivity. Protection and restoration of meadows requires management of the activities that could affect the vegetation and the soils, which in turn affect the overland and subsurface flow and storage of water. In most settings, meadow habitats are vulnerable to grazing and other types of surface disturbance such as off-highway vehicle (OHV) use and mining operations. These impacts can affect soil stability, water-holding capacity, and plant composition. In areas where management has been altered, proactive stabilization of gullies may be required to slow or reverse the causes of the degradation until the system can begin to recover on its own.

2.10.2 Steens Mountain Cooperative Management and Protection Area

Four subbasins (Table 2.11) comprise the subbasin review area in the Steens Mountain CMPA. These are Guano, Harney/Malheur Lakes, Alvord Lake, and Donner und Blitzen. The entire Steens Mountain CMPA is within these four subbasins and is within an internally draining watershed. The topography of these large areas directs surface and some shallow subsurface water to streams, rivers, lakes, reservoirs or playas. The subbasins are displayed on Figure 2.9. These subbasins are part of the larger Oregon Closed Basins Subregion and the Pacific Northwest Region.

The Guano Subbasin does not contain any reservoirs or lakes that are within the Steens Mountain CMPA. The Alvord Lake subbasin contains several lakes that are within the Steens Mountain CMPA. These lakes include Wildhorse, Little Wildhorse, Mann, Fifteen Cent, Ten Cent, Five Cent, Marys, and Comegys. There are no reservoirs in the Alvord Lake Subbasin that are within the Steens Mountain CMPA. The Donner und Blitzen subbasin is just under 500,000 acres in size. It includes several reservoirs, lakes and most of the Donner und Blitzen River system which are within the Andrews MU or the Three Rivers portion of the Steens Mountain CMPA. The reservoirs include Krumbo, Kern, Larkspur, and Grandad. The lakes include Baca, Five Mile, Marshall, Ham Brown, Lily, Pate, Fish, Lost, and Honeymoon. The Donner und Blitzen River system flows north in this subbasin into the Andrews MU and then into the Harney/Malheur Lake Subbasin north of the Andrews MU. The Harney/Malheur Lake Subbasin is approximately 908,000 acres and does not include any reservoirs or lakes within the Steens Mountain CMPA.

2.10.2.1 Streams

The streams in the subbasin review area originate in the higher elevation hills and mountains. They flow to the lower elevation valleys, lakes, rivers, wetlands, and playas. The discussion of the streams and surface water use for the Steens Mountain CMPA is identical to the discussion under the Andrews MU (Section 2.10.1).

2.10.2.2 Surface Water Quality

To meet the requirements of the Clean Water Act, the State of Oregon produced the 1988 Oregon Statewide Assessment of Nonpoint Sources of Water Pollution Report. The report identified waters affected by nonpoint source pollution, categories of nonpoint source pollution, the process for identifying BMPs, and state and local nonpoint source programs. The report also listed stream segments with moderate to severe water quality impacts affecting desired beneficial uses. Approximately 45 percent of the stream miles examined were identified as either having no nonpoint source-related water quality problems, or inadequate data to make a determination. Many reaches exhibited nonpoint source pollution problems that affect beneficial uses including fisheries, aquatic habitat, wildlife habitat, and water contact recreation.

Major causes of degradation cited in the report were the presence of animal waste, surface erosion, sedimentation, and the removal of riparian vegetation and stream channel thermal cover. Land uses which

Table 2.11: Major Subbasins of the Steens Mountain CMPA

Subbasin	HUC	Total Acres[1]	State Acres	Private Acres	CMPA BLM Acres	CMPA Stream Miles[2]
Guano	17120008	73,679	0	2,839	70,840	189
Harney/Malheur Lakes	17120001	22,910	0	4,725	18,185	59
Alvord Lake	17120009	125,901	433	5,792	119,675	382
Donner und Blitzen	17120003	270,694	637	53,231	216,825	707
Total		**493,184**	**1,070**	**66,587**	**425,525**	**1,337**

[1] The total acres value covers the subbasin area within the Steens Mountain CMPA boundary.
[2] The stream miles include all perennial, intermittent and ephemeral streams within the Steens Mountain CMPA boundary. There are approximately 371 miles of perennial streams in the Steens Mountain CMPA.

Table 2.12: Water Quality Limited Streams within the Steens Mountain CMPA

Stream Name	Parameter	Segment	Sources
Harney/Malheur Lake Subbasin			
Riddle Creek	Temperature-Summer	Mouth to Headwaters	BLM Data (1993)
Donner und Blitzen River Subbasin			
Little Blitzen River	Temperature-Summer	Mouth to Canyon Mouth	BLM Data (1995)
South Fork Donner und Blitzen	Temperature-Summer	Mouth to Headwaters	BLM Data (1995)
Ankle Creek	Temperature-Summer	Mouth to Headwaters	BLM (1997)
Big Indian Creek	Temperature-Summer	Mouth to Headwaters	BLM (1997)
Deep Creek	Temperature-Summer	Mouth to Headwaters	BLM (1996-1997)
Donner und Blitzen River	Temperature-Summer	Page Dam to S. Fork/Little Blitzen Confluence	BLM (1996-1997)
Fish Creek	Temperature-Summer	Mouth to above Swamp	BLM (1995-1997)
Indian Creek	Temperature-Summer	Mouth to Headwaters	BLM (1996)
Mud Creek	Temperature-Summer	Mouth to Headwaters	BLM (1997)
Guano Subbasin			
Home Creek	Temperature-Summer	Mouth to Headwaters	BLM Data (1995-1997)

Stream Name	Parameter	Segment	Sources
Alvord Lake Subbasin			
Willow Creek (Steens Mountain)	Temperature-Summer	Mouth to Canyon	BLM (1996)

correlated with these problems were grazing, mining, and road construction. Additional land use problems identified were human and animal traffic (roads and trails), water withdrawal, reservoir storage and release, altered physical characteristics of the stream, and channelization or drainage of wetlands. The report identified many reaches with elevated stream temperatures, turbidity, nutrient loading, sediment, and low dissolved oxygen levels and flow volumes.

To fulfil some of the EPA Section 303(d) requirements, the State of Oregon updated its list of "water quality limited" waters in 1998 with additional updates expected in 2002. Table 2.12 lists the streams in the Steens Mountain CMPA which are 303(d) water quality limited streams.

There are no 303(d) listed streams within the Guano subbasin that are within the Steens Mountain CMPA.

The State of Oregon has established beneficial uses for the surface and ground water within the analysis area and water quality standards which protect these uses. The state designates beneficial uses at the basin level rather than the subbasin level. The Guano, Harney/Malheur Lakes, Alvord Lake, and Donner und Blitzen portions of the subbasin analysis area are within the Malheur Lake Basin. The State of Oregon is required to identify which beneficial uses a waterbody currently supports or could support in the future. The primary surface water beneficial uses are domestic water supply, fisheries, irrigation, livestock watering, wildlife, hunting, fishing, recreation, and aesthetics. Most streams in the Steens Mountain CMPA support the state designated beneficial uses. Elevated summer temperatures are the primary water quality problem identified by the state for all 303(d) listed streams in the Andrews MU and the Three Rivers RA portion of the Steens Mountain CMPA. While some stream measurements have been shown to violate the state standard for resident fish and aquatic life water temperature numeric criteria, it is not known if the natural temperature potential would meet the criteria.

2.10.2.3 Ground Water Quality

Refer to the ground water discussion under the Andrews MU for further information (Section 2.10.1.2).

2.10.2.4 Wetlands

Refer to the wetlands discussion under the Andrews MU for further information (Section 2.10.1.3).

2.11 Fisheries

2.11.1 Andrews Management Unit

Fish inhabit perennial and intermittent streams, springs, ponds, lakes and reservoirs throughout the Andrews MU. There are 4,430 miles of stream (also called lotic habitats) of which 429 miles are perennial stream, and 58,601 surface acres of ponds, reservoirs and lakes (lentic habitat) in the Andrews MU.

Public land in the Andrews MU provides habitat for twelve native fish species, distinct sub-species or distinct populations, and several introduced fishes (Table 2.13). A high proportion of the native fish fauna is endemic to relatively localized regions, primarily due to the unique post-Pleistocene climatic and geologic history of the Great Basin. Of the twelve native fish populations, six have distributions that are restricted to the Andrews MU for a major portion of their range (Catlow Valley redband trout, Great Basin redband trout, Malheur mottled sculpin, Borax Lake chub, Catlow Valley tui chub, Alvord chub).

Nonnative trout and sunfish have been introduced to the Andrews MU. The Oregon Department of Fish and Wildlife (ODFW) periodically stocks a coastal strain of hatchery rainbow trout in three reservoirs in the Andrews MU. State-stocked rainbow trout enter Krumbo Creek from Krumbo Reservoir, downstream on the Malheur National Wildlife Refuge. The Kings River has a self-sustaining population of rainbow trout established from previous stockings. Rainbow trout stocking of the Trout Creek system has resulted in a self-sustaining population of rainbow-cutthroat hybrids.

The Lahontan cutthroat trout, historically native to the nearby Lahontan basin, was introduced to several streams in the Alvord Basin in the 1970s. Several populations are now self-sustaining.

Other fish introduced to the Andrews MU include crappie, which have become established in Rock Creek

Table 2.13: Fish Species, Subspecies, or Distinct Fish Populations within the Andrews Management

Common Name	Scientific Name	Status			Native
		BLM	State[1]	Federal[2]	
Lahontan Cutthroat Trout	*Oncorhynclus clarki henshawi*		T	T	
Great Basin Redband Trout	*Oncorhynchus mykiss spp.*	Tracking			X
Brook Trout	*Salvelinus fontinalis*				
Rainbow Trout, generic	*Oncorhynchus mykiss*				
Mountain Whitefish	*Prosopium williamsoni*				X
Malheur Mottled Sculpin	*Cottus bairdi ssp.*	Sensitive			X
Borax Lake Chub	*Gila boraxobius*		E	E	X
Catlow Valley Tui Chub	*Gila bicolor spp.*	Tracking		S	X
Alvord Chub	*Gila alvordensis*	Assessment			X
Longnose Dace	*Rhinichthys cataractae*				X
Speckled Dace	*Rhinichthys osculus*				X
Redside Shiner	*Richardsonium balteatus*				X
Largescale Sucker	*Catostomus macrocheilus*				X
Bridgelip Sucker	*Catostomus columbianus*				X

[1]State Status (ODFW): E-endangered; T-threatened
[2]Federal Status (USFWS): T-threatened; S-Species of special concern with conservation agreements.

Reservoir. Brook trout, commonly introduced for a sport fishery, are probably also present. Several other transplants (guppies and other aquarium fish, several types of sunfish) are commonly found in Great Basin aquatic systems, the result of unauthorized introductions by private individuals (Sigler and Sigler 1987). These species may be present in the Andrews MU.

Two fish found on the Andrews MU are listed as threatened or endangered by both the State of Oregon and the federal government (Lahontan cutthroat and Borax chub). Five species or populations are considered assessment, tracking, or sensitive by the BLM. (One amphibian, the Columbia Spotted Frog, is a candidate for listing under the Endangered Species Act and is discussed in the Wildlife Section of this document.)

The condition of fish populations is highly dependent on the quantity and quality of available habitat. The condition of aquatic habitat, in turn, is a reflection of physical and biological processes operating throughout the watershed. Streams, for example, transport water and sediment through a watershed. Changes in rates of erosion in upland areas can therefore affect stream ecosystems (e.g., increases in fine sediment supply to the stream negatively affect salmonid spawning and the production of aquatic macroinvertebrates, an important food source for all fish). The integrity of uplands in the watershed therefore has significant consequences for the health of aquatic ecosystems.

Fish habitat is also dependent on the integrity of the stream channel, floodplain, and adjacent riparian vegetation. Riparian vegetation moderates water temperature, adds structure to the banks to reduce erosion, and provides overhead cover for fish. Intact vegetated floodplains dissipate stream energy, store water for later release, and provide rearing areas for juvenile fish. Well-established riparian woodlands also supply woody debris to the stream channel, an important component in developing habitat complexity in stream channels.

Since riparian vegetation and fish habitat are ecologically interconnected, the condition of riparian

habitat is an indicator of the condition of fish habitat. In 1998, the 312.1 miles of riparian habitat on public land in the Andrews MU were in a variety of habitat conditions (Draft SEORMP/Final Environmental Impact Statement [FEIS] 1998). There were 55.1 miles (17.7 percent) in poor condition, 115.4 miles (37.0 percent) in fair condition, 65.6 miles (21.0 percent) in good condition, and 40.8 miles (13.1 percent) in excellent condition. The condition on 35.2 miles (11.3 percent) of riparian areas had not been evaluated. Of the 205 miles of streamside riparian areas that were in fair, poor, or unknown condition, 4.5 miles (2.2 percent) were in a downward trend, 51 miles (24.8 percent) were static, and 94.5 miles (45.9 percent) were in an upward trend, with the trend on the remaining 55 miles (27.1 percent) being unknown. Of the 106.4 miles in excellent or good condition, 37.7 miles (35.4 percent) were in an upward trend, 58.4 miles (54.9 percent) were static, no miles were in a downward trend, and 10.3 miles (9.7 percent) had an unknown trend.

Water quality is another indicator of the condition of fish habitat. Several streams in the Andrews MU in the Donner und Blitzen, Guano and Alvord Lake drainages have been listed as water-quality limited (Draft SEORMP/FEIS 1998). All of these streams are listed for high summer water temperature, and most contain fish of special management status.

The following section is a description of sensitive fish species found in the Andrews MU. It includes a discussion of distribution and current status, important habitat relationships, and key factors influencing status. Much of the following discussion is excerpted from the Draft SEORMP/FEIS and the ICBEMP scientific assessment (see these documents for references).

2.11.1.1 Redband Trout

Redband trout (*Oncorhynchus mykiss* spp.) are a subspecies of rainbow trout. The rainbow trout is a widely distributed western North America native salmonid. Rainbow trout have been segregated into three forms (Behnke 1992): 1) Coastal rainbow trout west of the Cascade/Sierra mountain divide; 2) Interior Columbia River redband trout upstream of Celilo Falls, including the Fraser and Athabasca rivers in Canada, the upper Klamath River Basin, and the isolated interior basins of Oregon; and 3) the Sacramento-San Joaquin redband trout (Behnke 1992). Although the systematics are incomplete, physical characteristics and genetic studies support the view that these three rainbow trout forms warrant subspecific recognition (Allendorf 1975); Allison and Bond 1983; Berg 1987; Stearley and Smith 1993; Utter and Allendorf 1977). Based on available information, the two populations of redband trout found on the Andrews MU, present in the Catlow Valley and Harney-Malheur Lake watersheds, are therefore likely to be members of the same subspecies.

Distribution and Status

The redband trout is widely distributed throughout the Interior Columbia Basin, including southern Oregon closed desert basins. On the Andrews MU, it is found in the Donner und Blitzen River and Kiger Creek, both in the Harney-Malheur Lakes watershed, and in the Catlow Valley. The Catlow Valley population historically occurred in Home, Threemile, Skull, and Rock Creeks. Based on an ODFW survey in 1995, the persistence of the population in Skull Creek is questionable.

The redband trout is considered a species of special concern by the American Fisheries Society and all states in the historical range, and is classified as a tracking species by the BLM (Williams et al. 1989). Six Great Basin populations (including Catlow and Harney populations) were petitioned for listing as threatened or endangered under the Endangered Species Act in 1997. In March of 2000, the USFWS published a finding that listing for these populations is not currently warranted (FR Vol. 65, No. 54, pp. 14932-14936). In their determination, the USFWS found that the most appropriate grouping of the six populations under consideration was as a single Distinct Population Segment (DPS), the biological unit managed for protection under the Endangered Species Act of 1973 (ESA) based on available evidence. Additional evidence could possibly qualify individual populations as a DPS for ESA consideration in the future.

The population in Threemile Creek still exists, but its small size and limited distribution resulted in an ODFW emergency angling closure in 1995-1996. The limited distribution and small population sizes of Catlow redband trout, as well as the Catlow tui chub (discussed below), prompted the August 1997 completion of the "Catlow Redband Trout and Catlow Tui Chub Conservation Agreement and Strategy." This Conservation Agreement was entered into by the BLM, the USFWS, Malheur National Wildlife Refuge, the ODFW, and a private landowner in order to expedite conservation measures needed for the recovery of the species. The agreement, which focuses on the fishes' habitat outside the Rock Creek drainage, has two objectives: 1) to reduce and eliminate significant threats; and 2) to enhance and/or stabilize specific stream reaches of occupied and unoccupied historic habitat. A large portion of Threemile Creek and part of

Home Creek are within the Steens Mountain CMPA and are therefore included the Conservation Agreement.

Habitat Relationships

Redband trout occupy a wide array of habitats (Scott and Crossman 1973). Research suggests that redband trout are found in a wide range of conditions, often more extreme than those associated with other species. Populations found in the southern Oregon deserts inhabit turbid and alkaline waters that range from near freezing to over 25º C (Johnson and others 1985; Kunkel 1976; Zoellick 1995). Redband trout are often found in warmer waters than other salmonids; however, in warmer and drier environments the loss of riparian cover has been associated with reduced numbers and production of fish (Li et al. 1994; Tait et al. 1994).

Relatively little work has been done to define habitat use for this fish, but patterns are generally similar to other salmonids. Thurow (1988) found redband trout most abundant in pool habitats and in association with cover components including undercut banks, large woody debris, and over-hanging vegetation. Some have suggested that redband trout, like steelhead, may be associated with higher gradient channels, often in riffles or with substrates dominated by boulders, cobbles and pocket water (Kunkel 1976).

Key Factors Influencing Status

Hybridization and competition are biotic factors influencing redband trout status. Introduced fishes create risks of genetic introgression, competition for food and space, predation, and increased exposure to disease (Fausch 1988; Reisenbichler 1977). Introduced rainbow trout are now the most widely distributed fish in the Inter-Columbia Basin and have contributed to losses of the native redband trout genotype through introgression (Behnke 1992; Campton and Johnston 1985). The introduction of hatchery-raised rainbow trout as early as 1925 has potentially altered many of the unique characteristics of the native redband on the Andrews MU. Brown trout are widely introduced and represent a potentially important predator and competitor, particularly in the southern range where redband trout are associated with warmer water temperatures. Brook trout (*Salvelinus confluentus*) have also competed with the redband for resources and habitat. In attempts to sustain remaining native redband trout, several state agencies have suspended all stocking of nonnative species in isolated watersheds.

Fragmentation and isolation of habitats influence redband trout status. If watershed disturbances result in loss of corridors or connecting habitats, remaining redband trout populations can be progressively isolated into smaller and smaller patches of productive habitats. Corridors that provide habitat for migration, rearing, and over-wintering may be critical to the conservation of species where connections among population are important (Hanski and Gilpin 1991; Rieman and McIntyre 1993). Such effects can be exaggerated by climate change. The loss of genetic variability through genetic drift may be a particularly important problem in the more isolated watersheds on the southern portion of the range of redband trout (Berg 1987; Wallace 1981).

Habitat degradation is a third factor influencing redband trout status. Great Basin redband trout habitats have been altered by a host of land use practices (Anonymous 1995; Moskowitz and Rahr 1994; Perkinson 1995; Williams and others 1989). Diverting water for irrigation threatens many populations in the southern portion of the range. Thurow (1988) reported four principle effects from water diversions: dewatering of stream reaches, loss of fish in unscreened diversions, blockage of migration corridors, and alteration of stream channels by earthmoving equipment. The loss or conversion of riparian cover has been caused by grazing, mining, urbanization, and agriculture (Meehan 1991). In desert climates, the loss of riparian canopy has been associated with excessive temperature and reduced redband trout abundance (Li and others 1994; Tait and others 1994). Channel alterations associated with attempts to control flooding, develop floodplains, and construct roads have been extensive. Channel alterations adversely affect stream hydraulics (Bottom et al. 1985), nutrient pathways (Schlosser 1982), invertebrate production (Benke et al. 1985), and fish production.

2.11.1.2 Lahontan Cutthroat Trout

The Lahontan cutthroat trout (*Oncorhynchus clarki henshaw*i) is native to the Pleistocene Lake Lahontan Basin of northwestern Nevada, northeastern California, and a small adjacent portion of southeastern Oregon. It has been introduced elsewhere in southeastern Oregon and eastern Washington.

Distribution and Status

Lahontan cutthroat trout are native to the McDermitt Creek drainage, a Quinn River tributary of the larger Lahontan Basin, in southeastern Oregon. In 1991, genetic analyses of cutthroat trout in Willow and Whitehorse creeks, also in southeastern Oregon, found the inhabitants to be genetically indistinguishable from *O. c. henshawi* (Williams 1991). During the 1970s, trout from Willow and Whitehorse creeks were introduced into Denio, Van Horn, Pike, Mosquito, Little McCoy, Big Alvord, Little Alvord, Cottonwood,

and Willow creeks in the adjacent Alvord Basin. Surveys conducted in 1991 confirmed that Lahontan cutthroat trout still persist in many Alvord Basin streams. Trout from Willow and Whitehorse creeks were also introduced into Guano Creek in 1957 (Hanson et al. 1993), but subsequent introduction of other strains has affected the genetics of the original Lahontan stock. A population of Lahontan cutthroat trout also inhabits Mann Lake and possibly connecting tributaries. Since these fish originated from hatchery stock, they are not considered pure-strain Lahontan cutthroat trout, but are used by the state as a source of eggs for its hatchery program.

Pursuant to the ESA, this subspecies is federally listed as threatened throughout its native range. The BLM annually initiates formal Section 7 consultation with the USFWS regarding authorization for grazing allotments in the Alvord Basin where Lahontan cutthroat trout are present. These consultations have concluded that current grazing practices are not likely to jeopardize the continued existence of the trout. In 1995, the USFWS office in Reno formalized a cooperative management agreement among the ODFW, Nevada Division of Wildlife, USFS, and the BLM for the coordination and performance of activities identified in the Lahontan Cutthroat Trout Recovery Plan. The primary purpose of the agreement was to provide specific direction to conserve the trout and reduce or remove threats that could prevent its recovery. The Burns District is in compliance with recovery plan recommendations.

Habitat Relationships

Although somewhat hardier than other cutthroats, the Lahontan subspecies requires cool water temperatures, deep-water refuges, and silt-free gravels for spawning. Optimal riverine habitat for Lahontan cutthroat trout is characterized as clear, cold water with an average maximum summer temperature of less than 22º C; an approximate 1-to-1 pool-to-riffle ratio; well-vegetated, stable stream banks; at least 25 percent of the stream area providing cover; a relatively stable water flow regime; and a relatively silt-free rocky substrate in riffle-run areas (USFWS 1993).

Key Factors Influencing Status

Habitat degradation, especially loss of riparian vegetation, is identified as a key factor in declining Oregon stream populations. Loss of vegetation has resulted in stream temperatures that have far exceeded those considered optimal for the sub-species. Dissolved oxygen levels in such reaches are too low. Drought conditions coupled with extremely low temperatures during winter have caused stream segments to freeze completely. Loss of vegetation has resulted in the loss of forage organisms and cover (Hanson et al. 1993). Excessive turbidity and sedimentation also contribute to habitat degradation problems because of their effects on food production, spawning areas, and feeding ability (Hanson et al. 1993). Water diversions and the introduction of nonnative salmonids are also key factors. Since native populations of Lahontan cutthroat trout in southeastern Oregon are naturally small and isolated, they are at risk. Many introduced populations are especially vulnerable because the number of founding fish was less than 30.

2.11.1.3 Borax Lake Chub

The Borax Lake chub (*Gila boraxobius*) is a small cyprinid fish restricted to the Borax Lake ecosystem of south-eastern Oregon. Due to its restricted distribution and threats to its remaining habitat, it is listed as an endangered species by the USFWS and the State of Oregon. The BLM has consulted and will continue to consult with the USFWS on any of its activities that may affect the Borax Lake chub or its habitat.

Distribution and Status

This species is known only from Borax Lake and associated waters in Harney County, Oregon. The Borax Lake chub is a sister taxon of the Alvord chub *(Gila alvordensis*) from which it became isolated as the waters of pluvial Lake Alvord receded (Williams and Bond 1980). The Borax Lake chub occurs in Borax Lake, which covers ten acres and is located within 60 acres of private land, its associated outflows including Lower Borax Lake (public land), and surrounding marsh and pools (mixed public and private).

From 1986 to 1988, population estimates for the Borax Lake chub ranged from 3,934 to 13,319 depending on the year and season (Williams 1995). Based on water conditions, hundreds of chubs also may occur in outflow creeks, and during wet years, up to a few thousand also may occur in Lower Borax Lake.

Habitat Relationships

The Borax Lake chub is restricted to the thermal waters of Borax Lake and its outflows. Waters flow out from the elevated rim of Borax Lake in many directions, but more typically to the southwest, where they enter a marsh and then flow into Lower Borax Lake (a reservoir). Reproduction is limited to Borax Lake; Borax Lake chubs in other habitats gain access through interconnected out-flows and marshes. In Borax Lake, the species occurs throughout the lake except in hot spring inflows, where temperatures exceed approximately 34º C.

Key Factors Influencing Status

Threats of geothermal energy exploration and manipulation of surface flows from Borax Lake were the primary factors that resulted in the 1980 listing of the species by emergency provision under the ESA. Changes in thermal flows that enter the lake could cause slight temperature increases or decreases that would be detrimental to the species. Alterations in surface flows from Borax Lake could isolate subpopulations adjacent to the lake causing their desiccation. Due to the restricted size of the lake, threats also exist from introductions of chemicals or nonnative species. Protection of the fragile salt crusts that maintain water level at Borax Lake is also critical (USFWS 1987). Livestock grazing and physical damage from off road vehicles and humans are the primary risks to shoreline salt crusts. The species is also at risk because of its highly restricted range and specialized habitats.

2.11.1.4 Alvord Chub

Alvord chub (*Gila alvordensis*) are endemic to the Alvord Basin of southeastern Oregon and northwestern Nevada. It is a moderately sized minnow that inhabits marshes, creeks, and springs with little or no current. The American Fisheries Society considers the Alvord chub to be a species of special concern (Williams et al. 1989), and it is a BLM assessment species.

Distribution and Status

The Alvord chub is widely distributed within springs, creeks, and lakes in the Alvord basin. Williams and Bond (1983) reported Alvord chubs from 16 localities within the basin, including Serrano Pond, Trout Creek, Alvord Lake, and Pueblo Slough (on the Andrews MU) in Oregon, as well as Bog Hot Creek, Bog Hot Reservoir, Thousand Creek Spring, Thousand Creek, Continental Lake, Warm Spring, Dufurrena Ponds, Gridley Springs, and West Spring in Nevada. The current distribution of this species has apparently changed little during the past 100 years except for 1) a recent report of Alvord chubs in Juniper Lake, Oregon (Bond 1974), where they were introduced and subsequently disappeared; and 2) the elimination of the Alvord chub population from Thousand Creek Spring.

Habitat Relationships

The Alvord chub occurs in a wide variety of available habitats such as isolated springs, cool- and warm-water creeks, reservoirs, and lakes. Within the principal creek systems in the Alvord Basin, Trout Creek in Oregon and the Thousand-Virgin Creek system in Nevada, chubs occur commonly in the mid and lower elevation sections, but are rare or absent entirely from high elevations. Within spring systems, the Alvord chub occupies a variety of spring habitats except springs with water temperatures above 31º C. Alvord chubs are absent from Bog Hot Springs, which is fishless, and from Borax Lake, which is occupied by the Borax Lake chub *(G. boraxobius)*.

Key Factors Influencing Status

Alvord chubs appear capable of occupying a wide range of habitat conditions as long as relatively clean water persists that is free of introduced species. The Alvord chub has been eliminated from Thousand Creek Spring because of the presence of introduced guppies (*Poecilia reticulata*). Alvord chubs are absent from some ponds at Dufurrena, which are dominated by introduced centrarchids (Williams and Bond 1983). Introductions of nonnative fish and diversion of stream flows pose the greatest immediate risk to populations. Maintenance of the integrity of aquifers that feed surface waters in the Alvord Basin is critical to the long-term persistence of this species.

2.11.1.5 Catlow Tui Chub

The Catlow tui chub (*Gila bicolor* ssp.*)*, a small to medium-sized minnow, is a recognized though undescribed subspecies of the more widespread tui chub. Genetic analysis of the Catlow tui chub is underway at Oregon State University. Due to their restricted distributions and threats to remaining habitat, the subspecies is considered of special concern by the American Fisheries Society (Williams et al. 1989), and it is a BLM tracking species.

Distribution and Status

Historically, Catlow tui chubs occurred in three streams (Threemile, Skull, and Home creeks) that drain the west flank of the Catlow Rim and in Rock Creek along the western edge of Callow Valley (Bills 1977; Kunkel 1976). The Catlow tui chub has a restricted range, but appears to be locally abundant in streams and in Threemile Reservoir. An exception is Rock Creek, where only a few were found in 1994.

Habitat Relationships

Little is known about the habitat relationships of the Catlow tui chub. Their preference for low gradient reaches of Skull, Threemile, and Home creeks suggests an affinity for low velocity habitats, which is typical of most tui chubs. They also appear to be well-adapted to Threemile Reservoir, at the downstream end of Threemile Creek. Catlow tui chubs occur in streams occupied by redband trout (Kunkel 1976).

Key Factors Influencing Status

Diversions of creek flows for irrigation reduce Catlow tui chub habitat. The low gradient reaches that it prefers are also subject to degradation from livestock overgrazing. Due to the Catlow tui chub's restricted distribution, disturbances such as drought, fire, and human land use practices place populations at risk.

2.11.1.6 Malheur Mottled Sculpin

Malheur mottled sculpin (*Cottus bairdi* spp.) is a recognized, though undescribed, subspecies of the more widespread mottled sculpin. The Malheur mottled sculpin is endemic to the Harney Basin of southeastern Oregon, including the Silvies and Blitzen river systems. It is listed as a sensitive species by the State of Oregon and the BLM.

Distribution and Status

Historic distribution includes the Blitzen River and tributary streams on Steens Mountain, the Silver Creek drainage, the Silvies River and tributary streams, and the isolated drainages of Poison and Rattlesnake creeks. The sculpin in the Harney Basin is considered by Bailey and Bond (1963) and Bond (1974) to represent an undescribed relative of the mottled sculpin in the Snake River drainage. Malheur mottled sculpin historically inhabited Harney Basin (Malheur Lake Basin) when it was connected to the upper Snake River, and became isolated in small creeks when the basin dried up perhaps as recently as 8,000 years ago. Through more recent geologic events, mottled sculpin from the lower Columbia River drainage have entered the basin. This recent form of mottled sculpin has been hybridizing with the older, previously isolated form.

Habitat Relationships

Very little is known about the life history of the Malheur mottled sculpin, but it is assumed to be comparable to that of other mottled sculpins, *Cottus bairdi*. According to Bond (1974), the Malheur mottled sculpin requires cool-water streams with large gravel or rubble substrates for cover and spawning. It requires water temperatures below 26º C, with high dissolved oxygen and very low turbidity. Given these characteristics, the Malheur sculpin can occupy small headwater streams and larger rivers such as the lower Blitzen River.

Key Factors Influencing Status

Malheur mottled sculpin appear to be very sensitive to changes in water quality, including increases in temperature, sediments, and turbidity. Biotic interactions are not specifically known, but the occurrence of the Malheur sculpin would appear to be negatively correlated with the presence of introduced warm-water fishes such as catfish and centrarchids, which are more tolerant of turbid water conditions. Elevated water temperature, increased turbidity, and sediment transport caused by activities such as livestock grazing, road construction, and timber harvest activities are detrimental to the sculpin and have been cited by the BLM as causes for the decline of Malheur mottled sculpin populations in Silvies, Hay, Yellowjacket, and Emigrant Creeks within the Silvies Basin.

2.11.1.7 Management Activities

Many activities affect the habitat conditions for fish in the area. Road construction has altered the ability of many streams to access their flood plains and has straightened many channels, resulting in channel incision. Though the influence of logging has probably been limited in the area, logging and associated road construction can increase the amount of sediment and water supplied to stream channels. Grazing has removed bank stabilizing vegetation and has directly impacted banks. Water diversions impact fish habitat directly; irrigation water withdrawn from the major streams in the area reduces summer flows and raises water temperature. Channeling streams to better control the spread of water and removal of willows to create irrigated pasture and hay fields has resulted in channel incision and loss of habitat. Diversions often block upstream movement of trout from the lower reaches of streams and lakes to upper spawning areas.

Fisheries management in the Andrews MU is ongoing to restore, maintain, or improve habitat to provide for diverse and self-sustaining communities of fishes and other aquatic organisms. In keeping with these management objectives, the Act designated a Redband Trout Reserve and expanded the WSRs corridor within the Steens Mountain CMPA. These areas are discussed in the following sub-section and in the section on Special Management Areas.

2.11.2 Steens Mountain Cooperative Management and Protection Area

The Steens Mountain CMPA provides habitat for a diverse mix of native fish species, including several special status species, as well as nonnative fish species of recreational importance. The BLM manages 371 miles of streams and 1,597 surface acres of lakes in the area that support fish. The majority of the Steens Mountain CMPA is within the Donner und Blitzen subbasin with smaller sections in Guano and Alvord subbasins.

The east side of the Steens Mountain CMPA provides habitat for Lahontan cutthroat trout that were transplanted from the Willow-Whitehorse drainage of the Trout Creek Mountains. These fish are federally listed as threatened. The remaining area, which drains to Malheur Lake and features the Donner und Blitzen WSR system, provides habitat for the Great Basin redband trout (a BLM sensitive species) as well as the Malheur mottled sculpin. The Malheur mottled sculpin is a BLM Sensitive Species and a USFWS Species of Concern.

The Steens Mountain CMPA contains other native nongame species such as mountain whitefish and speckled dace, with a full complement of Malheur Lake fish species occurring in the Donner und Blitzen WSR and McCoy Creek. Nonnative game fish also occur, including brook trout, hatchery rainbow trout, and mixed-strain Lahontan cutthrout trout. These nonnative species, established for recreational fishing purposes, are in waterbodies that are completely or otherwise isolated from the systems with special status or federally listed fish species.

The area provides habitat for the Columbia spotted frog, a BLM Sensitive species and Federal Candidate species, and the Pacific chorus frog. Also present are numerous invertebrates, including typical stream species such as stoneflies, caddisflies and mayflies, and specialized intermittent lake species, such as fairy shrimp.

2.11.2.1 Redband Trout Reserve and Wild and Scenic Rivers

The RTR was mandated by the Act to conserve, protect, and enhance Redband trout and the unique ecosystem and to provide opportunities for research, education, and fish and wildlife-oriented recreation. The reserve consists of the Donner und Blitzen WSR above its confluence with Fish Creek and the adjacent riparian areas on public land within the Steens Mountain Wilderness.

The Act also designated Kiger Creek (4.25 miles), Wildhorse Creek (7.36 miles), and Little Wildhorse Creek (2.60 miles) as new WSRs. New segments of the Donner und Blitzen WSR including Ankle Creek (8.10 miles), South Fork of Ankle Creek (1.60 miles), and Mud Creek (5.10 miles) were also designated. These additions provide a total of 101.7 miles of WSR within the Steens Mountain CMPA.

The RTR and WSR areas are classified as Special Management Areas (SMAs) and are therefore discussed in detail in the SMA section of this document.

2.12 Wildlife and Wildlife Habitat

As a public land administrator in Oregon, the BLM is responsible for managing a wide array of habitats used by native and introduced wildlife species. The ODFW is responsible for managing animal populations. Management programs designed to benefit wildlife consider both population and habitat.

The BLM manages wildlife and its habitat in cooperation with the ODFW. Management is directed toward maintenance, improvement, and expansion of habitat quality and quantity under multiple use considerations.

2.12.1 Andrews Management Unit

The Andrews MU provides diverse habitat including sagebrush steppe, riparian and wetland, and juniper woodlands. Wildlife species utilizing the habitat include upland game bird species, Rocky Mountain elk, mule deer, pronghorn antelope, California bighorn sheep, cougars, raptors, waterfowl, shorebirds, wading birds, neotropical migrants, reptiles, amphibians, and invertebrates. The following section describes the wildlife habitat and species found in the Andrews MU. See Figure 2.10 for a depiction of wildlife range.

2.12.1.1 Sagebrush Steppe

The sagebrush steppe includes several upland vegetation communities with a shrubland character and a variable understory of grasses and forbs. The presence of a shrub overstory is associated with wildlife community diversity. Shrubby plants are important to most small and large wildlife because they supply food as well as hiding cover and structure. Within the sagebrush steppe community, grasses and forbs provide food and cover for wildlife. Habitats that provide a mix of grasses and forbs meet the needs of a wide range of species.

2.12.1.2 Riparian and Wetlands

Riparian areas consist of plant communities associated with streams and rivers. The structure, food, and water available in these areas make them the single most diverse and productive wildlife habitat. Well-developed riparian areas with trees, shrubs, grasses, forbs, sedges, and rushes provide valuable habitat for a wide array of wildlife species. Wetlands, which are either permanently or seasonally wet areas, are associated with various landscape settings, including reservoirs, sloughs, playas, meadows, springs, and seeps. Wetlands typically provide succulent green forage, insects, and drinking water for wildlife. Riparian and wetland areas

that do not support diverse plant communities still provide important sources of water and food for wildlife.

2.12.1.3 Juniper Woodlands

The juniper woodlands provide habitat for a large number of species supported within the Andrews MU. These woodlands vary greatly in their habitat value depending on factors such as height, density, and age of trees. Older trees may provide cavities for nesting birds. Deer and elk use juniper for thermal and escape cover. The distribution of juniper (normally between 5,700 to 6,560 feet elevation) influences the condition and quality of neighboring wildlife habitat.

2.12.1.4 Mule Deer

Mule deer (*Odocoileus hemionus*) are widespread throughout the Andrews MU. They are typically associated with complex mid to upper elevation plant communities supporting a wide variety of sagebrush, mountain shrubs, aspen, juniper, and herbaceous vegetation. Mule deer browse on shrubs and forbs, which provide most of their annual diet.

Thermal cover is critical on winter range to provide protection from wind and other adverse elements. Grassy slopes, meadows, brush fields, and other early successional stages (artificially created and otherwise) provide the majority of deer forage. During hot summer weather, aspen stands and juniper/big sage/antelope bitterbrush shrublands function as thermal cover, reducing heat stress on the animals.

Winter range is concentrated along the east margin of Steens Mountain adjacent to the Alvord Desert, along the western lower elevations of Steens Mountain down to the east margin of Catlow Valley, along Pickett Rim, Malheur Wildlife Refuge and in the lower elevations of the Pueblo Mountains and Trout Creek Mountains. The winter range occurs primarily in juniper woodland and sagebrush communities with interspersed grasses. Shrubs are the major component of the winter diet, primarily antelope bitterbrush, big sagebrush, curl-leaf mountain mahogany, and western juniper. When snow conditions make higher elevations unsuitable, deer will move to suitable habitat in lower elevations. Deer tend remain at the highest possible elevations until forced to winter concentration areas by snowfall.

Transition range can be divided into spring and fall. The vegetation of the spring transition range is similar to winter range and consists of sagebrush and juniper woodland. Grasses and forbs are important components of the spring transitional ranges. The fall transition ranges are vegetatively similar to summer ranges and consist primarily of aspen, shrub-steppe and juniper woodland communities. Maintaining migratory routes is critical to the seasonal deer movements.

2.12.1.5 Pronghorn Antelope

Pronghorn antelope (*Antilocapra americana*) are distributed throughout the Andrews MU. Winter range for pronghorn antelope is concentrated in Catlow Valley, Hawks Valley, the southeast end of the Pueblo Mountains, the Fields area, along the eastern base of Steens Mountain, Krumbo Reservoir, and north of Frenchglen. During the summer, pronghorn antelope are widely distributed throughout valley and mountain foothill habitats having low structure and a mixture of grasses, forbs, and shrubs. Sagebrush is used for both cover and forage. Seedings and wildland fires have converted some previously dense stands of sagebrush into suitable range.

BLM livestock water developments, particularly pipelines, have allowed pronghorn antelope to expand into formerly unoccupied areas. Forage competition with cattle and wild horses is slight due to forage preferences (Vavra and Sneva 1978). Lack of water at natural or developed sites can be a serious problem during periods of drought. BLM fence construction specifications allow pronghorn to move freely by having smooth bottom wires spaced at least 16 inches from the ground.

Coyote predation of pronghorn kids appears to be a primary factor limiting populations at this time. Oregon pronghorn populations have declined 20 to 30 percent since 1991 due to disease, predation, adverse weather conditions, poor nutrition, and habitat limitations.

2.12.1.6 Raptors

Raptors, which include predatory birds such as hawks, eagles, and falcons, can be found throughout much of the Planning Area. Local areas provide exceptionally high-quality raptor habitat and support high-density breeding populations. Common breeding species include the red-tailed hawk, Swainson's hawk, prairie falcon, American kestrel, golden eagle, northern harrier, sharp-shinned hawk, Cooper's hawk, and long-eared owl. Other less common breeders that may be found locally include the ferruginous hawk, burrowing owl, and northern goshawk. Important nesting habitats are in juniper and quaking aspen vegetation types. Volcanic ledges and buttes are often excellent nesting sites for many species. Prey species are more likely to be available for a wide range of raptors when plant

communities are structurally diverse and support mixtures of grasses, forbs, and shrubs.

Many breeding species also winter within the Planning Area. Species that only winter in the area include the rough-legged hawk and northern bald eagle. Rangeland treatments and power line locations and configurations are examples of actions that potentially threaten raptor reproduction and survival.

2.12.1.7 Neotropical Migrant Birds

The Planning Area supports a wide variety of neotropical migrant bird species (more than 110 species) that breed in the United States and winter in Central or South America. Populations of some of these species are declining as a consequence of land use practices and other factors. Neotropical migrants exhibit variable habitat requirements and are found in several habitat types.

2.12.1.8 Waterfowl and Shorebirds

As many as 70 species of waterfowl, shorebirds, and wading birds may use the area due to the nearby wetland habitat of the Malheur National Wildlife Refuge.

2.12.2 Steens Mountain Cooperative Management and Protection Area

2.12.2.1 Forested Wildlife Habitat

Forested habitat in the Steens Mountain CMPA is limited to 90 acres of a relic grand fir grove of which 20 acres are on public land. This area contains a mature overstory with a large number of young trees in the understory. The commercial value is marginal.

2.12.2.2 Rocky Mountain Elk

Rocky Mountain elk (*Cervus canadensis*) is one of Oregon's primary big game species found in the Steens Mountain CMPA. Since elk are also valued by the public for wildlife viewing, interest is high relative to the population levels and habitat conditions. The elk population remains near ODFW population objectives. Approximately 400 elk summer at mid to upper elevations on the mountain and winter at mid to lower elevations.

Forage areas are defined as vegetated areas with less than 60 percent combined canopy closure of trees and tall shrubs. This includes grass-forb, shrub, and open sapling phases of the early seral stage stands.

Three types of cover are important to elk: hiding cover, thermal cover, and optimal thermal cover. Hiding cover includes any vegetation capable of hiding 90 percent of a standing elk at 200 feet or less. Thermal cover and optimal thermal cover exist in juniper woodlands and juniper/big sage areas.

Winter range is an important consideration in managing elk populations. During winter, elk use south-facing slopes and valley bottoms because of warmer temperatures, reduced snow depths, and available forage. During periods of hot summer weather, north-facing slopes and high elevation western juniper/shrub sites provide important thermal cover.

2.12.2.3 Mule Deer

Mule deer are widespread in the Steens Mountain CMPA, particularly in the upper elevations; however, mule deer populations are approximately 70 percent of ODFW objectives. Deer winter range in the Steens Mountain CMPA is an important resource and occurs on both the east and west sides of the mountain.

2.12.2.4 Pronghorn Antelope

Pronghorn antelope are distributed throughout much of this area. They are associated with sagebrush habitat with low structure and a mixture of grasses, forbs, and shrubs.

2.12.2.5 Bighorn Sheep

Bighorn sheep (*Ovis canadensis* ssp.) are located in the remote and complex mountainous terrain in the Steens Mountain CMPA. The populations on Steens Mountain are along the Catlow Rim, the east rim, and along the gorges of the Donner und Blitzen WSR. These populations are healthy and regionally important. Some animals have been captured and used for relocations within Oregon and other western states.

2.12.2.6 Raptors

Raptors occur throughout much of the Steens Mountain CMPA. The Catlow Rim provides high density breeding habitat. Common breeding species include Cooper's hawk, red-tailed hawk, Swainson's hawk, sharp-shinned hawk, prairie falcon, golden eagle, and long-eared owl. Less common breeding raptors found in the Steens Mountain CMPA include ferruginous hawk, burrowing owl, and northern goshawk.

2.12.2.7 Waterfowl and Shorebirds

As many as 70 species of waterfowl, shorebirds, and wading birds may use the area due to the nearby wetland habitat of the Malheur National Wildlife Refuge. These species exhibit variable habitat requirements and are found in several habitat types.

2.13 Special Status Animal Species

Special status animal species occur on public land within the Planning Area. Special status designations are assigned for many reasons including limited distribution, habitat loss resulting from environmental impacts, suspected or documented population declines, or some combination of these factors. These are priority species for various surveys to determine their distributions, abundance, and habitat preferences. Table 2.14 contains a list of special status animal species found in the Planning Area.

2.13.1 Andrews Management Unit

2.13.1.1 Northern Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) was listed in 1978 as a federal threatened species in Oregon under the Federal ESA of 1973. The Planning Area supports a wintering population of northern bald eagles, but no breeding pairs. The Planning Area supports roughly 20 to 30 wintering eagles, primarily in areas associated with major river systems and large reservoirs.

Some systematic winter inventories have been conducted in the Andrews MU's one winter roost site. Whether this site is used consistently or sporadically due to weather conditions and available prey is unknown. Bald eagles in the Andrews MU are primarily associated with public land near the Malheur National Wildlife Refuge.

2.13.1.2 American Peregrine Falcon

The American peregrine falcon (*Falco peregrinus* ssp.) was federally listed as an endangered species throughout its range under the Federal ESA of 1973, and as a state endangered species under the Oregon ESA (ORS 1987). The peregrine falcon, like the bald eagle, was de-listed in 1999 after reaching the recovery goals set forth in the 1982 Pacific Coast Recovery Plan for the American peregrine falcon.

The peregrine falcon is a cliff-nesting species. Nest sites are usually associated with cliffs near water with an abundant population of nongame birds, shorebirds, and waterfowl, the peregrine's primary prey. American peregrine falcons are occasionally seen along the Catlow Rim during fall or spring migration, but no recent nesting activity has been documented. A USFWS recovery plan for the peregrine falcon requires the BLM to take action to conserve this species.

2.13.1.3 Northern Kit Fox

The northern kit fox (*Vulpes velox*) is a state threatened species that is present within some of the salt desert shrub habitat of the Andrews MU. According to ODFW data, kit fox populations are currently low but are higher than when the species was added to the state list of threatened species. Oregon kit fox populations are thought to be naturally limited by the amount of salt desert habitat available. The kit fox is common in Nevada and some other western states. USDA-APHIS animal damage control actions avoid kit fox occupancy areas.

2.13.1.4 Columbia Spotted Frog

Columbia spotted frogs (*Rana luteiventris*) occur in perennial warm marsh habitats with few or no cold springs, ponds, lake edges, or slow moving streams. Spotted frogs are often associated with non-woody wetland plant communities and use algal mats for resting. Egg masses are usually piled on the stream bottom in very shallow water in late spring, sometimes by several females in the same location in successive years. Egg masses often rise above the surface of the water. Froglets and adults occur in well-vegetated ponds, marshes, and slow streams, but have been found in disturbed habitats where vegetation may be more or less reduced.

Spotted frogs become active as early as February. Males are not territorial and call during the day using a series of six to nine low clucking sounds. Egg laying has been documented as early as March in southwestern British Columbia and as late as June 30 in higher elevations. In mountain and interior sites, spotted frogs have been known to overwinter as larvae,

Table 2.14: Special Status Animal Species in Southeastern Oregon

Common Name	Scientific Name	Status	ONHP
Amphibian			
Columbia Spotted frog	*Rana luteiventris*	FC	L3
Western toad	*Bufo boreas*	BT	L3
Bird			
American white pelican	*Pelecanus erythrorhynchos*	BA	L2
Bank swallow	*Riparia riparia*	BT	L4
Black rosy finch	*Leucosticte atrata*	BT	L4
Black tern	*Chlidonias niger*	BT	L3
Black-throated sparrow	*Amphispiza bilineata*	BT	L3
Bobolink	*Dolichonyx oryzivorus*	BT	L4
Broad-tailed hummingbird	*Selasphorus platycercus*	BT	L4
Ferruginous hawk	*Buteo regalis*	BS	L3
Flammulated owl	*Otus flammeolus*	BS	L4
Forster's tern	*Sterna forsteri*	BT	L3
Franklin's gull	*Larus pipixcan*	BA	L2
Great egret	*Casmerodius albus*	BT	L3
Greater sage-grouse	*Centrocercus urophasianus*	BS	L2
Greater sandhill crane	*Grus canadensis ssp.*	BT	L4
Horned grebe	*Podiceps auritus*	BT	L4
Least bittern	*Ixobrychus exilis*	BA	L2
Loggerhead shrike	*Lanius ludovicianus*	BT	L4
Mountain quail	*Oreortyx pictus*	BT	L4
Northern bald eagle	*Haliaeetus leucocephalus*	FT	L1
Northern goshawk	*Accipiter gentilis*	BS	L3
Olive-sided flycatcher	*Contopus cooperi*	BT	L3
Peregrine falcon	*Falco peregrinus ssp.*	BS	L1
Pinyon jay	*Gymnorhinus cyancephalus*	BT	L4
Sage sparrow	*Amphispiza belli*	BS	L4
Snowy egret	*Egretta thula*	BA	L2
Swainson's hawk	*Buteo swainsoni*	BT	L3
Western burrowing owl	*Athene cunicularia*	BS	L3
Western snowy plover	*Charadrius alexandrinus*	ST	L2
White-faced ibis	*Plegadis chihi*	BT	L4

Common Name	Scientific Name	Status	ONHP
Willow flycatcher	*Empidonax traillii adastus*	BT	L4
Yellow-billed cuckoo	*Coccyzus americanus*	FC	L2
Fish			
Alvord chub	*Gila alvordensis*	BA	L2
Borax Lake chub	*Gila boraxobius*	FE	L1
Catlow Valley tui chub	*Gila bicolor ssp.*	BT	L3
Great Basin redband trout	*Oncorhynchus mykiss ssp.*	BT	L3
Lahontan cutthroat trout	*Oncorhynchus clark henshawi*	FT	L1
Malheur mottled sculpin	*Cottus bairdi ssp.*	BS	L3
Mammal			
California bighorn sheep	*Ovis canadensis ssp.*	BT	L4
California wolverine	*Gulo gulo*	ST	L2
Canada lynx	*Lynx canadensis*	FT	L2
Fringed myotis	*Myotis thysanodes*	BT	L3
Kit fox	*Vulpes velox*	ST	L2
Long-eared myotis	*Myotis evotis*	BT	L4
Long-legged myotis	*Myotis volans*	BT	L3
Pallid bat	*Antrozous pallidus*	BT	L3
Preble's shrew	*Sorex preblei*	BT	L3
Pygmy rabbit	*Brachylagus idahoensis*	BA	L2
Silver-haired bat	*Lasionycteris noctivagans*	BT	L3
Spotted bat	*Euderma maculatum*	BA	L2
Townsend's big-eared bat	*Corynorhinus townsendii*	BS	L2
Western small-footed myotis	*Myotis ciliolabrum*	BT	L3
White-tailed antelope ground squirrel	*Ammospermophilus leucurus*	BT	L3
White-tailed jackrabbit	*Lepus townsendii*	BT	L3
Yuma myotis	*Myotis yumanensis*	BT	L4
Reptile			
Desert horned lizard	*Phrynosoma platyrhinos*	BT	L3
Long-nosed leopard lizard	*Gambelia wislizenii*	BT	L4
Mohave black-collared lizard	*Crotophytus bicinctores*	BT	L3
Northern sagebrush lizard	*Sceloporus graciosus*	BT	L4

Status:
FE=Federal Endangered
FT=Federal Threatened
FC=Federal Candidate:
ST=State Threatened: An animal that could become endangered within the foreseeable future within all or a portion of its range.

BS=Bureau Sensitive: Species that could easily become endangered or extinct in a state, are restricted in range, and have natural or human-caused threats to survival.

BA=Bureau Assessment: Species not presently eligible for official federal or state status but are still of concern and need protection of mitigation win BLM activities.

BT=Bureau Tracking: Species that may become of concern in the future, but more information is needed to determine status for management purposes.

ONHP:

L1=List 1: Taxa that are threatened with extinction or presumed to be extinct throughout their entire range.

L2=List 2: Taxa that are threatened with extirpation or presumed to be extirpated from the state of Oregon.

L3=List 3: Species for which more information is needed before status can be determined, but which may be threatened of endangered in Oregon or throughout their range.

L4=List 4: Taxa which are of concern, but are not currently threatened of endangered.

metamorphosing the following spring (Nussbaum et al. 1983). This phenomenon has not been documented in the resource area. When disturbed, spotted frogs will move to deeper water on the stream bottom and conceal themselves in dense vegetation or bottom debris.

2.13.1.5 Greater Sage-Grouse

The western subspecies of the Greater sage-grouse (*Centrocercus urophasianus*) was federally listed as a Category 2 candidate species by the USFWS until the classification was dropped from the list. The Greater sage-grouse is currently a BLM sensitive species .

Sage-grouse populations have exhibited long-term declines throughout North America, declining by 33 percent over the past 30 to 40 years. The species has disappeared in five states (Arizona, New Mexico, Oklahoma, Kansas, Nebraska) and one province (British Columbia). It is "at risk" in six other states (Washington, California, Utah, Colorado, North Dakota, South Dakota) and two provinces (Alberta, Saskatchewan). Even in states where the species is considered to be “secure" (Oregon, Nevada, Idaho, Wyoming, Montana), long-term population declines have averaged 30 percent (Connnelly and Braun 1997; Crawford and Lutz 1985). The ODFW has indicated that the population is stable (Willis et al. 1993).

The Sage and Columbian Sharp-tailed Grouse Technical Committee of the Western States Association of Fish and Wildlife Agencies (WAFWA) published guidelines for the maintenance of sage-grouse habitats (Braun et al. 1977). WAFWA has directed the technical committee to revise those guidelines and it is likely that the habitat management guidelines portion of that document will be largely incorporated by the BLM into a new version of the 1974 BLM Technical Note “Habitat Requirements and Management Recommendations for Sage-Grouse.” The Oregon BLM is committed to the development and implementation of a "Sage-grouse/Sagebrush-Steppe Conservation Assessment and Strategy Plan" that may focus on sage-grouse as an icon, but is dedicated to all of the shrub-steppe obligate species that have been the focus of the ICBEMP effort.

Greater sage-grouse depend on sagebrush-grassland communities. Big sage, the primary species upon which grouse depend in Harney County, is usually associated with western juniper, although juniper is not a necessary habitat component. Greater sage-grouse are most frequently found in sage covered flatlands or gently rolling hills. Free water is also a component of sage-grouse habitat, but it is not required for daily survival. Water is used when available from late spring through late fall, and sage-grouse attain their highest population densities in areas that contain abundant and well distributed surface water. Sage-grouse rely on snow and ice during the winter months and moisture from succulent plants when available.

Migratory sage-grouse populations may travel great distances seasonally. Summer and winter ranges may be as far as 50 miles apart, or more. If deep snow covers spring and summer ranges, the birds may migrate to lower elevations to find food and cover. Sage-grouse may nest and raise their broods in sage-covered mountain valleys at high elevations. A variety of sage stand conditions are necessary for good grouse habitat. In general, good habitat should contain openings less than 300 yards in circumference, some dense stands, and approximately equal amounts of tall and short sagebrush plants. Sage-grouse use three habitat types throughout the year: breeding habitat, brood-rearing habitat, and wintering habitat.

Lek sites, or sage-grouse strutting and mating grounds, are usually small open areas from 0.01 to ten acres in size, with low, sparse sagebrush or areas devoid of vegetation. Grassy swales, natural and irrigated meadows where grass has been removed, burned areas, cultivated fields adjacent to sagebrush-grass rangelands, and dry lakebeds are often used as leks.

Optimum sage-grouse nesting habitat consists of sagebrush stands containing plants 16 to 32 inches high with a canopy cover ranging from 15 percent to 25 percent, and an herbaceous understory of at least 15 percent cover that is at minimum seven inches tall. These conditions should be found on 80 percent of the breeding habitat for any given population of sage-grouse (Klebenow 1969; Wallestad and Pyrah 1974).

Early brood rearing generally occurs relatively close to nest sites, but movements of individual broods may be highly variable (Connelly 1982; Gates 1983). Sage-grouse chick diets include forbs and invertebrates. Insects, especially ants and beetles, are an important component of early brood rearing habitat. Brood habitats containing a variety of plant species tend to provide an equivalent diversity of insects, which are important chick foods. As sagebrush habitats dry up and herbaceous plants mature, hens move their broods to moister sites during June and July where more succulent vegetation is available (Klebenow 1969; Gill 1965; Connelly et al. 1988). Optimum brood-rearing habitat consists of sagebrush stands that are 16 to 32 inches tall with a canopy cover of ten to 25 percent and an herbaceous understory of 20 percent (ten percent grasses and ten percent forbs). This type of habitat should be found on at least 40 percent of an area that is considered brood habitat.

As fall progresses toward winter, sage-grouse start to move toward their winter ranges. At such times, their diet shifts primarily to sagebrush leaves and buds (Connelly et al. 1988). Timing of movement depends on weather severity and snow depth. Sage-grouse winter habitats are relatively similar throughout most of the species range. Since the sage-grouse winter diet consists almost exclusively of sagebrush, winter habitats must provide sagebrush that is exposed at least ten to 12 inches above snow level (Hupp and Braun 1989). Such conditions provide both food and cover for wintering sage-grouse, which tend to prefer areas of high canopy cover as well as taller Wyoming big sagebrush. They will select the plants with the highest protein content. In situations where snow covers the sagebrush, the birds will move to areas where it is exposed. Sagebrush of varying heights should be found on 80 percent of the wintering range of a given population to guarantee that enough forage will be available.

The greatest negative impact on sage-grouse is the destruction or adverse modification of their habitat. Presently, sage-grouse in reduced numbers occupy most of their historic range in the Planning Area but have disappeared from areas on the periphery of former ranges where large areas of sagebrush have been removed. During the past 40 years many sagebrush covered valleys and foothill ranges have been sprayed, plowed, chained, burned, disked, or cut in an attempt to convert these ranges to grasslands.

Research data are scant regarding the impact of fire and plant succession on sage-grouse. Recent research conducted in Idaho on a pair of burned and unburned plots within Wyoming types revealed that a sub-population of sage-grouse was reduced within the burn area compared to the control site (Idaho Department of Fish and Game, W-160-R-21, September 1994). Although both the control and burned areas showed a general decline in the sage-grouse population during the research period, the reduction was greater in the treatment area (83 percent) than the control area (55 percent), and the difference was associated with losses in nesting cover. Sage-grouse select nest sites near the largest sagebrush plants with a good herbaceous understory, which is precisely where wildland fire or prescribed fire tends to travel.

As is typical within the science and research community, some dispute occurs regarding prescribed fire and its beneficial or adverse effects. The BLM acknowledges these differences in opinion; however, the ongoing threat of wildland fire to grouse habitat indicates that prescribed burning in Wyoming sage types should be avoided. The recommendations do not prevent the use of prescribed fire; they simply redirect where it is appropriate to do so without jeopardizing an important sagebrush steppe species that may be listed as threatened or endangered.

Other factors possibly impacting sage-grouse habitat and populations include irrigation projects and degradation of riparian areas. The creation of reservoirs and diversion of water for irrigation may eliminate important high-quality brooding habitat. Conversely, some of these land uses probably benefit sage-grouse. Openings in large sagebrush stands can create feeding and brooding areas that may benefit sage-grouse if water is nearby. The creation of meadows by seeding and water diversion may add to food supplies, and reservoirs and ponds may provide standing water. In addition, removal of large decadent sagebrush stands has permitted young sagebrush stands to develop and provided openings for the establishment of grasses and forbs.

2.13.1.6 California Bighorn Sheep

California bighorn sheep were eliminated from Oregon by 1915. Current populations are the result of numerous ODFW-directed reintroductions and supplemental releases during the past two decades. Bighorns from Steens Mountain have been captured and used for

relocations within Oregon and other western states. Although populations within the analysis area have recently increased, the current distribution in Oregon still represents a small percentage of the former historic bighorn range (Oregon's Bighorn Sheep Management Plan 1992-1997).

Approximately 300 bighorns reside within the Andrews MU in six primary locations. Small herds occupy other regions of the resource area. Summering bighorns from the Alvord Peak area and Pueblo Mountains usually winter in the low mountains east of Fields. This is the only major migratory bighorn movement known in eastern Oregon.

Disease transmission between domestic sheep and bighorns can cause rapid and massive bighorn losses, which results in public controversy. No licensed sheep grazing permits overlap with currently occupied bighorn range, nor has the ODFW indicated any problems with disease transmission between cattle and bighorn sheep.

In accordance with an approved state management plan, the ODFW wishes to continue releasing bighorns into suitable unoccupied habitat and to conduct supplemental releases into currently occupied habitat. New release areas, supplemental release areas, and currently occupied bighorn habitat are collectively identified as "bighorn range" on Figure 2.10.

2.13.2 Steens Mountain Cooperative Management and Protection Area

2.13.2.1 Columbia Spotted Frog

In the Steens Mountain CMPA, spotted frogs occur on the Donner und Blitzen River and some of its tributaries, in Fish Lake, and in Lily Lake.

2.13.2.2 Greater Sage-grouse

The Steens Mountain CMPA supports a small but stable and regionally important population of Greater sage-grouse. They are considered an indicator species of the sagebrush steppe habitat and are closely associated with the presence of big sagebrush and low sagebrush communities on which they depend for food, cover, and nesting. Twenty-two leks have been identified in the Steens Mountain CMPA.

2.13.2.3 California Bighorn Sheep

Bighorn sheep typically prefer remote and complex mountainous terrain with adequate water. Due to this preference, bighorn sheep and livestock grazing areas are usually spatially separated (Ganskopp 1984). Although some competition can occur in the lower less steep portions of bighorn sheep ranges, no serious forage competition conflicts have been documented. Approximately 475 bighorn sheep are estimated to populate the Steens Mountain CMPA (1993 data). Bighorns from Steens Mountain have been captured and used for relocations within Oregon and other western states.

2.13.2.4 Raptors

Raptors occur throughout much of the Steens Mountain CMPA. Special status species include ferruginous hawk, burrowing owl, bald eagle and northern goshawk.

2.14 Wild Horses

2.14.1 Andrews Management Unit

The Wild Free-Roaming Horse and Burro Act (PL 92-195) states: "It is the policy of Congress that wild free-roaming horses and burros shall be protected from capture, branding, harassment, or death; and to accomplish this they are to be considered in the area where presently found as an integral part of the Public Lands." After passage of this act in 1971, the Andrews MU was inventoried for free-roaming horses and burros. Six areas in the Andrews MU were designated as Herd Areas (HAs) containing wild horses. No burros were found in these areas.

In implementing this new program, one large HA that spanned two BLM Districts was divided into several units, another HA was discontinued, and two other HAs were combined. The large HA was divided because of political boundaries and for ease of management. Two other HAs were combined to create a unit with viable habitat and enough horses for a viable herd. One HA was discontinued because most of the area was privately owned, there was a lack of publicly owned water sources, and the limited horse numbers precluded maintenance of a viable herd. As a result, five of the HAs have been designated Herd Management Areas (HMAs) (Figure 2.12) where wild horses are present and actively managed today. One additional HA remains, but does not contain wild horses.

Previous land use plans established Appropriate Management Levels (AMLs) within each HMA to maintain public land resources, including wild horse habitat, in a satisfactory condition and to minimize unacceptable impacts to these resources. Monitoring data throughout the duration of those plans support established AMLs. The AML for each HMA is defined as an acceptable numerical range with a single number

being the midpoint of that range. The maximum number of the AML range determines forage allocations for horses in the HMA. In establishing the AML range (Table 2.15), the following issues were considered: maintenance of a thriving, natural ecological balance; biological/social need of the herds; economics of management actions; reasonable cycles of gathering; genetic diversity; and the population at which resource deterioration could be expected.

To prevent resource overuse and to maintain a thriving ecological balance, gathering takes place as a herd reaches the maximum number in the established AML range, and when monitoring data indicate that an excess number of horses exists. Depending on reproductive rates, results of range and monitoring data, death rates, funding, public concern, and other special management considerations, horses are gathered and removed every three to four years. Horse populations are usually reduced to the minimum number of the AML range to avoid the need for frequent and costly gathering. Following minimum feasible management practices, all animals above the lower limit of the AML range are considered excess. Site-specific details of gathering, including trap location, are determined at the time of each gather. Most of the horses gathered are adopted from the Burns Wild Horse Corrals, but some are transported to other adoption sites throughout the United States.

Some HMAs are fenced to control livestock movement; however, these fences also create barriers to wild horse movement. After the livestock is removed at the end of the grazing season, gates are left open to allow horse movement within the HMA. Open gates prevent entrapment of horses that could lead to malnutrition and death of otherwise healthy animals. The absence of reliable year-round water, especially in drought years, is a limiting factor within the HMAs of the Andrews MU.

Most mature horses are 14 to 15.5 hands tall and weigh 950 to 1,250 pounds. Mature stallions are usually slightly larger than mares. Wild horses in these HMAs exhibit saddle stock conformation, but each herd has its own unique characteristics. Two herds exhibit Spanish mustang characteristics, one herd has a large component of horses with pinto coloration, and the other herds display a variety of colors.

The Alvord Tule HMA is located completely in the Andrews MU. It is located east of Steens Mountain and consists of 343,201 acres in the Andrews MU. The AML is from 73 to 140 head of horses and the allotted grazing use is 1,680 AUMs. Dominant colors in the Alvord/Tule Spring herd are bay, black, brown, sorrel, palomino, and buckskin. Historically, many of these horses have appeared to be of thoroughbred blood.

2.14.2 Steens Mountain Cooperative Management and Protection Area

All or a portion of four HMAs (Table 2.16) are located within the Steens Mountain CMPA. They include Heath Creek/Sheepshead HMA, Kiger HMA, Riddle Mountain HMA, and South Steens HMA. The total area of the HMAs within the Steens Mountain CMPA is 163,312 acres.

The Heath Creek/Sheepshead HMA is located northeast of Steens Mountain in the western part of the Sheepshead Mountain Range. This HMA contains 7,828 acres in the Steens CMPA. The AML is from 61 to 102 head of horses and the allocated grazing use is 408 AUMs. Major colors in the Heath Creek/Sheepshead herd are dun, black, brown, bay, sorrel, and an occasional paint. All are of saddle stock conformation.

The Kiger HMA is located north of Steens Mountain. This HMA contains 6,531 acres in the Steens CMPA with an AML of 51 to 82 head of horses, and an allocated grazing use of 984 AUMs. The Kiger HMA is managed for horses exhibiting Spanish mustang characteristics. These horses are often referred to as “Kiger Mustangs” and possess the physical color characteristics called the “dun factor” which includes dun, red dun, grulla, buckskin, and variations of these colors. Other characteristics include dorsal stripes on the back and zebra stripes on the knees and hocks.

The Riddle Mountain HMA is located on the north side of Steens Mountain. This HMA contains 25,328 acres in the Steens area. The AML is from 33 to 56 head of horses and the allocated grazing use is 672 AUMs. Horses in the Riddle Mountain HMA are managed for Spanish mustang characteristics similar to those found in the Kiger HMA.

The South Steens HMA is located on the west side of Steens Mountain, in the area of the Donner und Blitzen WSR. This HMA contains 123,625 acres in the Steens CMPA. The AML is from 159 to 304 head of horses and the allotted grazing use is 3,648 AUMs. Common colors of wild horses in the South Steens herd are sorrel, bay, gray, and pintos of various colors. Pintos are often called “paints” and have historically been of great interest to the public. Paints currently constitute approximately one-third of the population of this herd. Other colors seen are chestnut, brown, black, palomino,

Table 2.15: Herd Management Areas in the Andrews MU and Steens Mountain CMPA

HMA	BLM Total HMA Acres	BLM Acres in AMU	BLM Acres in CMPA	AML Range	Forage Allocation (AUMs)
Alvord/Tule Springs	343,201	343,201	0	73 to 140	1,680
Heath Creek/Sheepshead	62,427	54,599	7,828	61 to 102	408
Kiger	38,359	0	6,531	51 to 82	984
Riddle Mountain	32,653	0	25,328	33 to 56	672
South Steens	127,838	4,213	123,625	159 to 304	3,648
Total	**604,478**	**402,013**	**163,312**		**7,392**

blue roan, red roan, and dun. Most animals are of saddle stock conformation.

The Burns District's Kiger and Riddle HMAs were gathered in August 1999. A total of 118 excess horses were removed to improve management of rangelands. These animals were delivered to the Burns Wild Horse Corrals and were made available to the public through the Wild Horse Adoption Program. The Alvord-Tule Springs HMA was gathered in 2001. Seventy horses were collected and made available to the public.

The BLM now uses competitive bidding to establish adoption fees. Competitive bidding replaces the lottery method used in the past, in which adopters had to rely on "the luck of the draw" for horse selection. Competitive bidding makes all animals available to all adopters, and animals are sold to the highest bidders.

2.15 Fire Management

2.15.1 Ecological Background

Fire has played a significant role in the development of most plant communities in the western United States. The role that fire plays depends on the severity, intensity and frequency of burning as well as elevation and precipitation. Fire changes plant community structure and species composition, and alters site nutrient dynamics. The Planning Area has a wide variety of plant communities with varied fire histories. The Andrews MU averages about 15 wildland fires per year. Approximately 90 percent of the fires are caused by lightning and about ten percent are caused by humans. In 2001, the Planning Area had 32 fires, which burned approximately 21,000 acres (see Figure 2.11).

2.15.2 Andrews Management Unit

2.15.2.1 Fire Ecology of Major Vegetation Types in the Andrews Management Unit

Sagebrush shrub/grassland is the most common vegetation type found throughout the Andrews Management Unit. The main sagebrush vegetation sub-types are dominated by big sagebrush (Wyoming and basin), low sagebrush, silver sagebrush, and mountain big sagebrush. Low sagebrush and all subspecies of big sagebrush are easily killed by fire and recolonize a site by seeds stored in the soil or by in-migration of wind-dispersed seeds from outside the burned area. Following a fire, silver sagebrush may regenerate from roots. Recovery times of all the sagebrush species greatly depend on seed and moisture availability following disturbance.

Sagebrush fire return intervals are difficult to determine because the plants are typically entirely consumed by fire and do not leave fire scars as evidence that can be used to determine historical fire regimes. Until recently, the extent and dates of fires have not been recorded and post-fire succession has not been studied in detail. However, site productivity affects the fire behavior and frequency in these sagebrush stands. Sites with higher productivity (more grass and forb understory) will carry fire more easily and more frequently than sites with low productivity. Silver and low sagebrush are usually found on less productive sites compared to mountain, basin, or Wyoming big sagebrush. Silver sagebrush, however, may also be associated with wetland species in areas of high productivity where fire history is more likely to be related to adjacent vegetation than to characteristics of the silver sagebrush plant communities themselves. Silver sagebrush is also found in a mosaic of vegetation types; it does not occupy large areas within the Planning Area.

Juniper woodlands are the most widely distributed woodland type in the Andrews MU. Fire histories are difficult to determine in juniper woodland. Ancient western juniper stands are located in rocky areas where fire return intervals (number of years between fire events) are more than 150 years. The location of these stands provides insufficient understory vegetation to carry fire. If fires did occur, they were often limited to one or two trees and areas of less than one acre. Under certain circumstances, large fires did move across these stands, but such events were rare. The mountain big sagebrush fire regime, where much juniper has encroached today, typically burned every 15 to 25 years (Miller and Rose 1998), a return interval similar to other shrub communities in the arid West. Young western junipers have thin bark and are readily killed by surface fires. Fire will carry through juniper stands with grass and shrub understory. As trees mature, they displace shrub and grass vegetation, leaving little surface vegetation. The stand then becomes more susceptible to erosion due to reduction in near-surface root systems of the lower stature plants. Older stands become resistant to fire because low productivity limits available fuel. Western juniper does not sprout after fire; re-establishment is from seed dispersed by water and animals, and the trees may be slow to regenerate.

Cheatgrass is an invasive nonnative annual grass that creates a fire hazard in limited parts of the Andrews MU. Cheatgrass thrives in disturbed environments, especially with fine-textured soils. Over-grazing and/or wildland fires provide conditions that are more favorable for cheatgrass than for native species. Cheatgrass often out-competes native grasses, forbs, and shrubs in disturbed areas, leaving large expanses dominated by it, or by cheatgrass combined with other nonnative species. Cheatgrass dominated areas tend to burn more frequently compared with the native shrublands and grasslands, diminishing the occurrence of associated woody plants. Fire does not increase cheatgrass production, but it does eliminate other plants and provides an opportunity for cheatgrass to increase at the expense of native grasses, forbs, and shrubs. Cheatgrass invasion substantially reduces biodiversity and the land's value for livestock forage and wildlife habitat. Reversal of this ecological cycle probably requires human intervention and/or alteration of current land management.

Crested wheatgrass is an introduced perennial grass that is sometimes planted to re-vegetate disturbed or burned sites. It is valuable for forage and soil stabilization and if planted in areas formerly dominated by shrubs, the fire regime may be altered.

2.15.2.2 Fire Management Needs, Status, and Alternatives

The Andrews MU fire management strategy focuses on wildland fire suppression and prescribed fire. The wildland fire season generally runs from mid-May through mid-September, while prescribed fires are usually planned for periods before and after the wildland fire season, depending on weather conditions. Prescribed burning can be used to meet resource and fire management objectives such as stimulation of plant growth, changes in species composition, or reduction in amounts of fuels and slash. Generalized policy and procedures for fire planning, assessment, and response are provided by the interagency Wildland and Prescribed Fire Management Policy, Implementation Procedures Reference Guide (National Park Service et al.1998).

Juniper Management

Encroachment of western juniper into mountain big sagebrush and quaking aspen plant communities is a major concern across large areas of the Andrews MU. Historically, western juniper was limited to rocky ridge tops and shallow soil areas where fires rarely occurred. Past livestock management and fire suppression have reduced the influence of fire in these areas. Subtle shifts in climate may have also helped Western juniper expand its range over the last 100 years. As western juniper density and cover increase, diversity of habitats decreases and potential conflicts over the remaining resources rise.

In addition to prescribed burning, chain saws have also been used to remove western juniper from quaking aspen stands prior to burning, and after burning if the fire did not carry through the stands. Cutting of western juniper helps to reduce competition and the disturbance stimulates suckering, or root-sprouting, of the quaking aspen. Stands that were burned or cut have been temporarily fenced from deer, elk, and domestic livestock, allowing quaking aspen suckers to grow above the reach of large domestic or wild herbivores.

Sagebrush

In lower elevation sagebrush plant communities, factors such as fuel conditions, proximity to sensitive habitats or presence of introduced annuals may make prescribed fire impractical. In these areas, the Burns DO is using a technique known as "brush beating"in which a large mower kills large sagebrush, but leaves smaller shrubs and herbaceous plants relatively unharmed. Cutting the brush in irregular shapes is another way to create a complex pattern or mosaic.

2.15.2.3 Prescribed Fires

The Burns district of the BLM is currently using a combination of prescribed fire and mechanical treatment to enhance and rejuvenate mountain big sagebrush and quaking aspen communities in the Andrews MU. These areas are important habitats for numerous wildlife species and are a significant forage resource for domestic livestock. Prescribed burning increases plant diversity at the species and landscape level, helps rehabilitate ecosystem functions and processes, reduces accumulation of hazardous fuels, and can increase quality of available forage through the release of nutrients.

Prescribed burns in 2001/2002 include V Lake (South Steens), Stonehouse (Northeast Steens) and East Ridge/Mid Kiger Gorge (North Steens) (Figure 2.12). The current prescribed fire program on the Andrews MU has successfully reintroduced fire to sagebrush and aspen plant communities. These management actions are improving habitat for numerous wildlife species and are providing higher quality forage for domestic and wild herbivores.

2.15.2.4 Wildland Fires

Wildland fire risk depends on the intensity and size of the wildland fire as well as the location, time of season, and time of day. Light intensity wildland fires, which occur within the historical fire return interval range, improve rangeland health and wildlife habitat. High intensity wildland fires radically alter rangelands and wildlife habitat, and can produce large amounts of smoke. Domestic livestock may be displaced for several years. Sensitive wildlife species such as sage-grouse, dependent upon shrub communities, suffer local population declines following large wildland fires. While species that favor early successional stages may benefit from wildland fires in the short-term, species that rely on older vegetation will suffer when that vegetation is burned. Severely burned landscapes lose soil, seed bank and microflora; consequently, they are more susceptible to invasions of noxious weeds and nonnative annual grasses such as cheatgrass, which further degrades rangeland health and wildlife forage. In addition, smoke emissions cause degradation of air quality. Fire also has an adverse effect on recreational and visual resources. In many cases, plant communities that have experienced fires on an average of every 25 years have not burned for over 100 years. Fuel loading is increasing across the area and will continue to increase until a fire event. This increased fuel loading has altered, and continues to alter, the fire regimes across the Andrews MU. Fire behavior and intensity continues to increase as the fuel levels increase.

To help reduce the ecological and human risks associated with wildland fires, the BLM regulates the activities of both industrial and non-industrial use of the public lands under its administrative umbrella. The BLM specifies the types of activities (such as chain saw use) that are acceptable at given fire danger levels. Some uses may also be managed through regulated closures and management directives for such activities as campfires and vehicles driving on public land. The directives are specific in terms of locations involved and actions prohibited. Such closures and directives are normally issued during periods of unusually high fire danger.

In case of multiple fires, suppression priority is given in decreasing order of importance to fires threatening life, property, and resources. Fires occurring within WSAs and other environmentally sensitive areas have received full suppression responses, but these responses are generally limited regarding the use of mechanical equipment and retardant. If a fire is likely to become large or to threaten life or property, the line officer can approve the use of mechanical equipment to assist in suppression. In that case, immediate rehabilitation occurs on all areas of ground disturbance.

Each RA has qualified resource advisors for fires that escape or have the potential to escape initial attack efforts. These advisors assist the incident commander with suppression decisions concerning resource values and priorities. These individuals know the resources and the landscape near the fire and have a working relationship with local landowners. Although resource advisors do not make suppression decisions, their advice and concerns have a direct bearing on most major suppression decisions.

2.15.3 Steens Mountain Cooperative Management and Protection Area

In 2001 there were six wildland fires totaling 241 acres in the Steens Mountain Wilderness, five wildland fires totaling one acre in several WSAs, and four wildland fires totaling 103 acres on combined BLM, Steens Mountain CMPA, and private lands.

In 1999, the Burns DO conducted two prescribed burning projects in the Andrews MU on Steens Mountain. The two projects treated 19,900 acres in mountain big sagebrush and western juniper. Approximately 57 percent of that area, or 11,400 acres, was actually burned. These burns produced a complex mosaic of burned and unburned areas.

The prescribed burns planned for 2001 will also be conducted in the Steens Mountain region (V Lake,

Stonehouse and East Ridge/Mid Kiger Grade). Over the long term, a complex pattern of burned and unburned areas in mountain big sagebrush and quaking aspen plant communities will be produced. This pattern, or mosaic, will also provide a diversity of habitats for numerous animal species.

Current fire management for the Steens Mountain CMPA is outlined in the Interim Management Policy and considers the provisions of the Act as well as the Wilderness Act. On all lands other than WSAs or designated wilderness within the Steens Mountain CMPA, the Interim Management Policy states that current fire management practices will continue subject to provisions in the Act. Within the Steens Mountain Wilderness, fire suppression will take place in accordance with the provisions of the Wilderness Act, Management of Designated Wilderness Manual 8560, and the Act. Pursuant to 8560 § .35A, all wildland fires will be suppressed until an approved Fire Management Plan is prepared. Suppression actions in the Steens Mountain Wilderness will be executed to minimize surface disturbance and alterations of the natural landscape as well as fire suppression costs, while being consistent with management objectives and constraints. Methods and equipment will be used which least alter the landscape or disturb the land surface. Suppression structures and improvements will be located outside the Steens Mountain Wilderness, except those that are the minimum necessary to protect life, property, public welfare and Steens Mountain Wilderness objectives.

Suppression preplanning will be conducted with review by an interdisciplinary team to determine appropriate response and equipment to be used in fire suppression. Protection of the Steens Mountain Wilderness resource will be made part of the suppression objectives for all fires. Tactics will utilize the minimum tool concept to achieve these objectives. Non-mechanized equipment will be used unless mechanized equipment is approved by the District Manager. Suppression work will be conducted to minimize ground disturbance and vegetation cutting while safely meeting objectives. Mop-up methods that minimize disturbance will be preferred.

Fire management within the WSAs will continue in accordance with the provisions of the Interim Management Policy For Lands Under Wilderness Review (*H-8550-1*). Until an approved Fire Management Plan is prepared, all wildland fires will be suppressed.

2.16 Woodlands

2.16.1 Andrews Management Unit

There are no significant forest stands in the Planning Area, however, juniper woodlands and several quaking aspen stands are present (see Figure 2.2).

2.16.1.1 Juniper Woodlands

Western juniper woodland is a common vegetation type in much of the subbasin review area. This vegetation type is typified by its open canopy (usually much less than 30 percent crown closure), single-story, short-stature (six to 20 feet tall) trees. Understory vegetation in most of the juniper woodland is dominated by species that are characteristic of sagebrush steppe.

Juniper is the most xeric of the main tree species in the region and therefore dominates the lower elevations of woodland areas. Historically, juniper woodland was confined to rocky slopes and areas of sparse vegetation, where the oldest stands are still found. Reduced wildland fire frequency resulting from the elimination of fine fuels and fire suppression activities during the past 100 years, has allowed the density of woody species, including juniper, to increase in sagebrush/bunchgrass communities. In recent times, juniper has also expanded into open meadows, grasslands, quaking aspen groves, and riparian communities. Periodic fires, which previously prevented successful establishment of juniper in fire-adapted vegetation types, have been controlled for over a century, allowing the spread of juniper. In addition, the heavy grazing that occurred between 1880 and 1930 may also have favored juniper expansion. This recent expansion into other communities results in variable stand characteristics and associated species.

In the Planning Area, juniper woodlands cover approximately 200,000 acres. Western juniper occurs across a broad variety of soils and terrain, resulting in highly variable woodland structure, composition, and function, as well as varying effects on ecological processes such as hydrology and nutrient cycling. Juniper is found primarily in the Steens Mountain CMPA between 5,700 to 6,560 feet in elevation, with some occurring up to 7,000 feet.

Shrub species that occur in juniper woodland include big and low sagebrush, bitterbrush, rabbitbrush, currant, and snowberry. Grass species that are common in the juniper woodland community include bluebunch wheatgrass, Sandberg's bluegrass, Idaho fescue, western and Thurber's needlegrass, and cheatgrass. Mountain

mahogany can occasionally be found at the upper elevations of this community. Among the rich array of forbs found in this community are the buckwheat and milkvetch species, balsam root, asters, phlox, pussytoes, lupine, yarrow, and phacelia species.

In Eastern Oregon, studies have shown that 95 percent of the junipers are less than 150 years old. The distinct areas of "old growth" juniper in the High Desert Province are being monitored, mapped, and studied from an ecosystem perspective. As the extent and density of western juniper woodland expand, overall regional habitat diversity decreases and potential conflicts over remaining resources increase. Present vegetation inventories do not define the limits of climax juniper woodlands or their potential for replacing other plant communities. Colonized juniper stands have been treated to restore areas to shrubland and grassland, improving forage for both livestock and wildlife. The juniper cuttings on deer winter range above Buck Creek are an example.

Additional information is needed to address the various challenges of juniper management. Gathering this information is one component of the WJMA created within the Steens Mountain CMPA. The WJMA, consisting of 3,267 acres of public land, will be used for experimentation, education, interpretation, and demonstration of management techniques for restoring historic fire regime and native vegetation communities. The WJMA is considered a SMA and is discussed further in that section.

2.16.1.2 Quaking Aspen

Quaking aspen occurs in areas of locally high soil moisture including riparian zones, seasonally wet areas, and groundwater seeps. In the Andrews MU, quaking aspen is found on the Pueblo and Trout Creek Mountains, and Steens Mountain at elevations of 6,400 to 7,900 feet. Isolated stands occur as low as 4,500 feet along some creek corridors and around springs. The distribution of quaking aspen has decreased over the past 100 to 200 years in the Planning Area, as in other parts of eastern Oregon. This decline has been attributed to overbrowsing by livestock and wildlife, loss of suitable habitat due to lowering of water tables, and possibly a reduction in fire frequency (Crowe 1996). Quaking aspen stands in the region are generally composed of larger trees, with little regeneration and few trees of sapling or pole size. Mature trees are usually at least 100 years old and are approaching the end of their life span. Under present climatic conditions, quaking aspen reproduces exclusively by root sprouting rather than by seed; therefore, the limited regeneration in the form of root suckers suggests either unfavorable physical habitat change or excessive browsing pressure by livestock or wildlife.

2.16.2 Steens Mountain Cooperative Management and Protection Area

The highest concentrations of juniper woodlands and aspen stands within the Planning Area occur in the Steens Mountain CMPA. The newly designated WJMA is also located in the Steens Mountain CMPA. These areas will be managed according to the previously outlined strategies and under the direction of the Act and the IMP for the Steens Mountain CMPA.

In the Planning Area, one area containing about 20 acres of grand fir is present in scattered stands. These areas contain a mature overstory with large numbers of young trees as an understory and have marginal commercial value.

Woodland management is outlined in the IMP for the Steens Mountain CMPA and stipulates the following: that the sale of commercial timber will not be permitted; that prescribed fire and juniper control projects planned prior to legislation which have completed NEPA documentation and conform with the Act may still be implemented within the Steens Mountain CMPA; and that new prescribed fire and juniper control projects will be evaluated through the NEPA process and coordinated through the SMAC to ensure they meet the requirements and purpose of the Steens Mountain CMPA.

2.17 Special Management Areas

Several SMAs) are located in the Planning Area. These include the Steens Mountain CMPA, ACECs, Research Natural Areas (RNAs), Wilderness, WSAs, WSRs, a WJMA, and a RTR. All of these areas have special values which warrant or require special management or protection and are, therefore, specifically addressed through the BLM planning process.

As a federal land management agency, the BLM is an active participant in managing designated WSRs, and in contributing to the eligibility, classification, and suitability studies of rivers listed in the Nationwide Rivers Inventory (NRI) and other potential rivers. Other potential rivers are those identified by Congressional action, the BLM, or the public, which might meet the qualifications for wild and scenic status. The Donner und Blitzen WSR comprises an expansive WSR corridor within the Steens Mountain CMPA, which is discussed in detail in Section 2.17.2.1.

There are 23 WSAs and the Steens Mountain Wilderness in the Planning Area. Due to the number, size and variable characteristics of the WSAs and the Steens Mountain Wilderness area, they are discussed separately in Section 2.18. The Steens Mountain CMPA section includes a separate discussion for SMAs within its boundaries as outlined in the various mandates and sections of the Act.

2.17.1 Andrews Management Unit

2.17.1.1 Areas of Critical Environmental Concern/Research Natural Areas

The FLPMA and BLM policy (BLM 1976; 1988a) require the BLM to give priority to designation and protection of ACECs during the land use planning process. ACECs may be nominated by BLM staff, other agencies, or members of the public at any time. ACECs are parcels of public land that require additional management attention to protect special features or values. ACECs may be established to protect important historic, cultural, or scenic values; fish, wildlife, or other natural resources; or human life and safety. RNAs are a specific type of ACEC that always contain natural resource values of scientific interest and are managed primarily for research and educational purposes. Outstanding Natural Areas (ONA), are another specific type of ACEC that exhibit outstanding scenic splendor, natural wonder or scientific importance. ACEC nominations are reviewed by an interdisciplinary team to determine whether or not they meet the relevance and importance criteria in BLM Manual 1613.1. Nominated ACECs that meet the relevance and importance criteria must be evaluated in a land use plan to ensure that protection is needed.

Seven ACECs, four of which are RNAs, are located in the Andrews MU. These ACECs were designated to provide special management and protection to areas with special characteristics such as diverse ecosystems, landforms, plant communities, and critical wildlife habitat. The areas include Alvord Desert ACEC, Borax Lake ACEC, Pickett Rim ACEC, Mickey Basin RNA, Pueblo Foothills RNA, Tumtum Lake RNA, and Long Draw RNA.

Management of the ACECs/RNAs is directed by the Andrews MFP for the entire area; the IMP for the Steens Mountain CMPA area; and the Wilderness Act for those ACEC/RNAs located in a WSA or the Steens Mountain Wilderness. Specific direction calls for retention of existing and designation of new ACECs/RNAs where relevance and importance criteria are met and special management is required to protect the values identified.

2.17.2 Steens Mountain Cooperative Management and Protection Area

2.17.2.1 Areas of Critical Environmental Concern/Research Natural Area

Eight ACECs, five of which are RNAs, are located in the Steens CMPA. These ACECs were designated to provide special management and protection to areas with critical wildlife and wild horse habitat, scenic qualities, and unique plant communities. The areas include Kiger ACEC, Alvord Peak ACEC, Steens Mountain ACEC, Little Wildhorse Lake RNA, Little Blitzen RNA, South Fork Willow Creek RNA, Rooster Comb RNA, and East Kiger Plateau RNA.

2.17.2.2 Wild and Scenic Rivers

To be eligible for inclusion as a WSR, a river must be free flowing and have at least one outstandingly remarkable river-related value within its immediate environment (usually a 1/4-mile corridor along each side of the river).The Donner und Blitzen WSR was designated in October 1988 when Congress passed the "Omnibus Oregon Wild and Scenic Rivers Act of 1988"; the management plan was completed in 1993. The Donner und Blitzen WSR is located almost entirely within the Steens Mountain CMPA and is made up of the following streams; Donner und Blitzen River, Fish Creek, Little Blitzen River, Big Indian Creek, Little Indian Creek, and South Fork Donner und Blitzen River. In 2000, the Act increased the WSR system by adding segments to the Donner und Blitzen WSR and designating new WSRs. The newly designated WSR segments are Kiger Creek (4.25 miles), Wildhorse Creek (7.36 miles), and Little Wildhorse Creek (2.60 miles); the additional segments included in Donner und Blitzen WSR are Ankle Creek (8.10 miles), South Fork of Ankle Creek (1.60 miles), and Mud Creek (5.10 miles). These additions provide a total of 101.7 miles of WSR within the Steens Mountain CMPA. The total area within all the WSR corridors including public, state, and private land is 31,482 acres. All WSR segments were designated "wild".

The ORVs associated with the Donner und Blitzen WSR include scenic qualities; geologic features; many types of quality recreational activities; native fisheries habitat; abundant wildlife; a wide variety of vegetation communities; a large number of Special status plant species; and historic cultural resources.

Kiger, Wildhorse and Little Wildhorse Creeks are also characterized by several ORVs. Wildhorse and Little Wildhorse Creek ORVs include scenic quality, recreation value, wildlife habitat diversity, and the

presence of special status plant species. The ORVs associated with Kiger Creek include scenic geologic features, diversity of wildlife habitat, and the presence of special status fish species. Ankle and Mud Creek ORVs have not yet been identified.

The Donner und Blitzen Wild and Scenic River and the newly designated WSRs are managed in accordance with the Act, the Wild and Scenic Rivers Act, the Wilderness Act and the IMP. In instances where management requirements for a stream segment described in the Act differ between the Wild and Scenic Rivers Act and the Steens Mountain Wilderness, the more restrictive requirements shall apply. The Donner und Blitzen National Wild and Scenic River Management Plan also continues to guide management of the Donner und Blitzen WSR, to the extent that the management plan is consistent with the Act.

2.17.2.3 Wildland Juniper Management Area

The restoration of historic fire regimes in the Steens Mountain CMPA is specified in the Act and discussed in the Fire Management Section (2.15). In order to reach this objective, various strategies and techniques for juniper management must be examined, including natural and prescribed burns. This is one reason why the Act established the 3,267-acre WJMA and released the area from WSA status. The WJMA now has special management status allowing for experimentation, education, interpretation, and demonstration of active and passive management techniques.

The WJMA was set aside in the Steens Mountain CMPA as a demonstration area. Current management actions such as burning, cutting with chainsaws, and fencing, will be applied in small areas. Interested parties will then be shown the techniques being used to manage western juniper plant communities on the mountain. New techniques will also be tested in this area for evaluation of their effectiveness; however, the size of the WJMA limits the scale of potential research projects.

2.17.2.4 Redband Trout Reserve

Portions of the Donner und Blitzen River located in the Steens Mountain Wilderness provide habitat for unique populations of wildlife, waterfowl, and fish, including a unique population of redband trout. The Donner und Blitzen RTR was created by the Act to conserve, protect, and enhance the Donner and Blitzen River population of redband trout and the unique ecosystem; and to provide opportunities for research, education, and fish and wildlife-oriented recreation. The RTR consists of the Donner und Blitzen WSR above its confluence with Fish Creek and the adjacent riparian areas on public land within the Steens Mountain Wilderness.

The management of this area is guided by the Act, the Wild and Scenic Rivers Act, the Wilderness Act, and the IMP, in addition to the required consultation with the SMAC and the ODFW. Recreation will be allowed in the RTR as long as it is consistent with the previously mentioned acts and management guidelines. Specific management criteria may be developed during the RMP/EIS process and included in that document.

2.18 Wilderness/Wilderness Study Areas

2.18.1 Andrews Management Unit

The FLPMA directs the BLM to manage the public lands and their resources under principles of multiple use and sustained yield. FLPMA identifies wilderness values as part of the spectrum of public land resource values and uses to be considered in the BLM's planning, inventory and management activities. A BLM wilderness area is an area of public lands that Congress has designated for the BLM to manage as a component of the National Wilderness Preservation System in accordance with the Wilderness Act of 1964. A WSA is a parcel of public land determined through intensive inventories to meet the definition of wilderness in Section 2(c) of the Wilderness Act.

Public lands were inventoried in the early 1980s to see if they contained wilderness characteristics. Those areas found to have wilderness characteristics were identified as WSAs and all other land was eliminated from further consideration in the wilderness review. Some of the criteria used in the wilderness inventory were naturalness, solitude, primitive and unconfined recreational opportunities, special features, and manageability.

In October of 2000, Congress passed the Act, which designated the Steens Mountain Wilderness Area in the Steens Mountain CMPA and expanded the Basque Hills WSA with a 3,840-acre addition in the Andrews MU. In addition, the Act modified some of the WSAs in the Steens Mountain CMPA and created a No Livestock Grazing Area within the Steens Mountain Wilderness.

Until Congress acts on the wilderness recommendations or otherwise releases the existing WSAs for other purposes, they will continue to be managed in accordance with the BLM's IMP for Lands Under Wilderness Review, FLPMA, and other applicable laws and policies.

As shown in Table 2.16, 16 WSAs are in the Andrews MU, ranging from approximately 8,500 acres to 236,000 acres.

2.18.2 Steens Mountain Cooperative Management and Protection Area

All or portions of seven WSAs are located within the Steens Mountain CMPA (see Table 2.17). The WSAs include Blitzen River, Bridge Creek, Home Creek, Lower Stonehouse, South Fork Donner und Blitzen, Stonehouse, and High Steens. The WSAs were modified to account for designation of the Steens Mountain Wilderness in October of 2000. A 3,267 acre parcel in the Bridge Creek and Blitzen River WSA was released from the management requirements of section 603(c) of FLPMA under the provisions of the Act and is no longer subject to management under wilderness suitability requirements set forth in that section. Otherwise, as stated in the Act, "any wilderness study area, or portion of a wilderness study area, within the boundaries of the Cooperative Management and Protection Area, but not included in the Steens Mountain Wilderness, shall remain a wilderness study area".

Management of existing WSAs in the Steens Mountain CMPA will continue as directed under the BLM IMP for Lands Under Wilderness Review, the Act, and FLPMA. Table 2.17 lists the WSAs in the Steens Mountain CMPA.

The Act established the Steens Mountain Wilderness consisting of 170,024 acres of federal land. Within the Steens Mountain Wilderness (Figure 2.18) is a No Livestock Grazing Area consisting of 97,671 acres of public land, creating the first cattle-free wilderness of its kind.

Subject to valid existing rights, the Steens Mountain Wilderness will be administered by the BLM in accordance with the provisions of the Wilderness Act, 43CFR 6300, the Management of Designated Wilderness Areas Manual 8560, and the Act.

The specific provisions are specified in Section 202 of the Act and include the following:

(a) GENERAL RULE. - The Secretary shall administer the Steens Mountain Wilderness in accordance with this title and the Wilderness Act (16 U.S.C. 1131 et seq.). Any reference in the Wilderness Act to the effective date of that Act (or any similar reference) shall be deemed to be a reference to the date of the enactment of this Act.

(b) WILDERNESS BOUNDARIES ALONG ROADS. – Where a wilderness boundary exists along a road, the wilderness boundary shall be set back from the centerline of the road, consistent with the BLM's guidelines as established in its Wilderness Management Policy.

(c) ACCESS TO NON-FEDERAL LANDS. – The Secretary shall provide reasonable access to private lands within the boundaries of the Wilderness Area, as provided in section 112(d).

Section 112(e)(1) of the Act states that "The Secretary shall provide reasonable access to nonfederally owned lands or interests in land within the boundaries of the Cooperative Management and Protection Area and the Wilderness Area to provide the owner of the land or interest the reasonable use thereof."

The road setbacks for wilderness boundaries are described in Section 2.29 of this document.

Except for the designated No Livestock Grazing Area, grazing of livestock will continue and be administered in accordance with the provision of section 4(d)(4) of the Wilderness Act, in accordance with the provisions of the Act, and in accordance with the guidelines set forth in Appendix A of House Report 101-405 of the 101st Congress.

Provisions of the general BLM wilderness policy in BLM Manual 8560 are as follows:

> 1. To provide for the long term protection and preservation of the area's wilderness character under a principle of non-degradation. The area's natural condition, opportunities for solitude, opportunities for primitive and unconfined recreation, and any ecological, geological or other features of scientific, educational, scenic, or historical value present will be managed so that they will remain unimpaired.
>
> 2. To manage the area for the use and enjoyment of visitors in a manner that will leave the area unimpaired for future use and enjoyment as wilderness. The wilderness resources will be the dominant consideration where a choice must be made between preservation of the wilderness character and visitor use.

Table 2.16: Wilderness Study Areas in the Andrews MU

Wilderness Study Area	Acres
Alvord Desert	97,760
Basque Hills	72,082
Disaster Peak	3,672
East Alvord	22,161
Hawk Mountain	24,226
Heath Lake	21,197
Mahogany Ridge	27,053
Pueblo Mountains	73,547
Red Mountain	15,659
Rincon	104,979
Sheepshead Mountains	21,679
Table Mountain	39,886
West Peak	8,598
Wildcat Canyon	8,543
Willow Creek	2,424
Winter Range	15,517
Total	**558,983**

Table 2.17: Wilderness Study Areas Located within the Steens Mountain CMPA

Wilderness Study Area	Acres
Blitzen River	31,737
Bridge Creek	14,284
High Steens	13,227
Home Creek	1,165
Lower Stonehouse	7,449
South Fork Donner und Blitzen	27,969
Stonehouse	22,765
Total	**118,596**

Table 2.18: Land Status within the Steens Mountain CMPA

Land Status	Acres
BLM[1]	170,024
State	433
Private	4,294

[1]After additional acres were acquired (through exchanges) in keeping with the Act

3. To manage the area using the minimum tool, equipment, or structure necessary to successfully, safely, and economically accomplish the objectives. The chosen tool, equipment, or structure will be the one that least degrades wilderness values temporarily or permanently.

4. To manage nonconforming but acceptable uses permitted by the Wilderness Act and subsequent laws in a manner that will prevent unnecessary or undue degradation of the area's wilderness character and with overall emphasis placed on retaining wilderness character. Proposed actions that may affect wilderness character will be assessed through the appropriate NEPA analysis.

5. The BLM will only approve that combination of routes and non-motorized modes of travel to nonfederal inholdings that the BLM determines will serve the reasonable purposes for which the nonfederal lands are held or used and cause the least impact on wilderness character.

Except as specifically stated in the Wilderness Act, it is also prohibited in wilderness to:

- Operate a commercial enterprise;
- Build temporary or permanent roads;
- Build aircraft landing strips, heliports, or helispots;
- Use motorized equipment; or motor vehicles, motorboats, or other forms of mechanical transport;
- Land aircraft, or drop or pick up any material, supplies or person by means of aircraft, including a helicopter, hang-glider, hot air balloon, parasail, or parachute;
- Build, install, or erect structures or installations, including transmission lines, motels, vacation homes, sheds, stores, resorts, organization camps, hunting and fishing lodges, electronic installations, and similar structures, other than tents, tarpaulins, temporary corrals, and similar devices for overnight camping;
- Cut trees;
- Enter or use wilderness areas without authorization, where the BLM requires authorization;
- Engage or participate in competitive use, including those activities involving physical endurance of a person or animal, foot races, water craft races, survival exercises, war games, or other similar exercises; or
- Violate any BLM regulation, authorization, or order.

2.19 Recreation

Federal agencies including the BLM, USFS and USFWS, administer over 51 percent of the lands in Oregon and 70 percent of the lands in southeast Oregon (Harney, Malheur and Lake Counties), making them the largest managers of outdoor recreation and land facilities in the state (Oregon Parks and Recreation 2000); therefore, the agencies play a major role in providing dispersed recreation opportunities as well as resource protection of some of the state's most unique and significant scenic, natural, and cultural resources.

Sightseeing, driving for pleasure, fishing, and hunting are among the most popular types of dispersed recreation, according to the Southeast Oregon Recreation Plan for Harney, Lake and Malheur Counties. Non-motorized boating, horseback riding, camping, hiking, wildlife viewing and OHV use are also popular activities in the Andrews MU. From October 2000 through September 2001, the Planning Area had 259,797 visitor days, up from 247,002 the previous year. Specific activities such as hunting, hiking, and trail use as well as sites visited are discussed below.

Special Recreation Permits

Special recreation permits are required for specific recreational uses of the public lands and related waters. They are issued as a means to manage visitor use, protect natural and cultural resources, and provide a mechanism to accommodate commercial recreational uses. Several types of uses require these permits.

Commercial use - Recreational use of public lands and related water for business or financial gain. Examples are scenic tours, outfitters and guides, trail rides, cattle drives, photography associated with recreational activity, and use by scientific, educational, and therapeutic or nonprofit organizations when certain criteria are met.

Commercial Day Use - Special commercial permit provided by the Burns DO for use within limited locations in the Planning Area. It is a one day permit available for commercial activities such as vehicle tours.

Competitive use - Any organized, sanctioned or structured use, event, or activity on public lands in which two or more contestants compete and either 1) participants, register, enter or complete an application

for the event or 2) a predetermined course or area is designated. Examples are OHV races, horse endurance rides, or mountain bike races.

Vending - Temporary, short-term, non-exclusive, revocable authorizations to sell goods or services on public land in conjunction with a recreation activity. Examples are teeshirt sales in conjunction with an OHV race, a hot dog stand at a motocross event, firewood sales in a BLM campground and shuttle services.

Special Area Use - Officially designated by statute or Secretarial order. Examples include camping in long-term visitor areas in California and Arizona or floating many BLM managed rivers. An August 17, 2001 federal register notice designated the Steens Mountain CMPA and the Burns DO WSAs as special areas for which permits are required for organized groups.

Organized group activity and event use - Permits for noncommercial and noncompetitive group activities and recreation events. Examples include a scout campout, a large family reunion, or a school group activity.

Special Recreation Management Area (SRMA) and Extensive Recreation Management Area (ERMA)
In order to manage recreation, public land is classified as SRMAs and ERMAs. In SRMAs, recreation is under intensive management and investment in facilities and supervision. ERMAs are typically managed for more dispersed recreation with less oversight of facility development. SRMAs and ERMAs are designated through the RMP Process.

2.19.1 Andrews Management Unit

Dispersed recreation opportunities exist throughout the entire Planning Area. Opportunities for developed recreation exist at several sites within the Andrews MU. The Lakeview to Steens Back Country Byway provides access to recreation opportunities in the Planning Area. Adjacent areas of interest managed by other agencies include the Malheur National Wildlife Refuge and Sheldon-Hart Mountain National Wildlife Refuge. Although the majority of visitors to the Andrews MU are from Oregon, an increasing number are from out of state and abroad. Recent publications and broadcasts featuring BLM attractions have increased visitation to the area.

2.19.1.1 Recreation Activities

The Andrews MU is within the ODFW's Central Hunting Area, including portions of Beattys Butte, Juniper, Steens Mountain, and Whitehorse hunt units. Deer, antelope, bighorn sheep, and elk are hunted with rifle, muzzle loader, and bow in this area as well as in the Steens Mountain CMPA. In the four hunt units combined, 8,323 hunter days were spent hunting deer with a 47 percent success rate; 3,237 hunter days were spent hunting elk with a success rate of 13 percent; and 923 hunter days were spent hunting antelope with an 87 percent success rate. Fishing is a popular activity in the Andrews MU with its wide variety of fish species including Lahontan cutthroat trout, redband trout and many others. There are several lakes, reservoirs, streams, rivers, and springs in the Andrews MU which provide fishing as well as sightseeing, camping, hiking, and wildlife viewing. These areas are discussed in detail in the Riparian Resources, Water Resources and Fisheries Sections (2.7, 2.10, and 2.11).

Many hiking trails in the Planning Area are located in the Steens Mountain CMPA; however, the most extensive, the High Desert Trail, also runs through the Andrews MU. A component of the National Recreation Trails System, it begins at Denio Canyon near the Nevada border south of Fields, Oregon, and is 240 miles long. The High Desert Trail uses a corridor concept with no clearly defined or maintained path to follow. Hikers choose their own route with the help of a printed guide and strategically placed cairns. Portions of the trail are open year round. The corridor is cooperatively managed with the Desert Trail Association.

Camping in the Andrews MU includes the Alvord Desert and primitive dispersed camping throughout the area. The Alvord Desert, part of the Alvord Desert WSA, provides primitive camping and includes a large playa with outstanding opportunities for solitude, land sailing, photography and OHV use. The Alvord Desert playa is a popular land sailing destination in the spring. From October 2000 through September 2001, the Alvord Desert had 37,204 visitor days with visitors splitting their time between camping, land sailing, photography and OHV use.

2.19.1.2 Off-Highway Vehicles

OHV use is frequently associated with hunting, fishing, and driving for pleasure and also occurs for administrative purposes such as management of livestock and maintenance of range projects. All public land in the Planning Area is designated as either open, limited, or closed with regard to vehicle use. In an open area, all types of vehicle use are permitted at all times. In a limited area, vehicle use is restricted at certain times, in certain areas, to designated routes, to existing routes or to certain vehicular uses. In a closed area, motorized vehicle use is prohibited. The BLM designates areas as "open" for intensive OHV use

where no compelling resource protection needs, user conflicts, or public safety issues exist to warrant limiting cross-country travel. The BLM designates areas as "limited" where it must restrict OHV use in order to meet specific resource management objectives. Areas are designated as "closed" if closure to all vehicular use is necessary to protect resources, ensure visitor safety, or reduce use conflicts. WSAs are usually limited, while wilderness areas are typically closed to OHV use. Prior to the passage of the Act, there were 842,551 acres open, 836,366 acres limited and zero acres closed to OHV use in the Planning Area. Since passage of the Act, specific revisions have been made to the Steens Mountain CMPA and the Steens Mountain Wilderness. In the Andrews MU the management of OHV activities is guided by the Andrews MFP which states the various protection goals of each designation.

2.19.1.3 Recreation Planning and Management

Special Recreation Permits

A total of 40 permits were in use during the 2001 fiscal year. Thirty-two permits were issued in the Planning Area during the year and an additional eight commercial permits were still active. Twenty were issued for winter recreation on the Steens, three for organized group functions, two for other uses, and 12 commercial permits were issued or re-authorized.

Some of the management objectives for recreation in the Andrews MU are outlined in he Andrews MFP:

- Encourage a wide range of recreation activities in addition to hunting and fishing;
- Cooperation with development of High Desert Trail;
- Limit vehicle use in campgrounds to ingress and egress;
- The objective of the Recreation and Management Program in the Andrews MU should be to provide quality recreational opportunities for the public; and
- Protect, preserve, and enhance recreational resources and provide facilities, information, and services to ensure safety and a maximum recreational experience.

2.19.2 Steens Mountain Cooperative Management and Protection Area

According to the Steens Mountain Management Plan of 1985, the season of use for the Steens Mountain CMPA is generally from July to November, with the highest use on holiday weekends and during hunting season. The main activities include sightseeing, camping, lake fishing, hiking, nature study, and hunting. Recreation use within the area also includes picnicking, biking, photography, rockhounding, snowmobiling, cross-country skiing, and OHV use.

The Steens Mountain CMPA includes the South Steens, Page Springs, Fish Lake, and Jackman Park campgrounds; the Mann Lake recreation site, and seven overlooks. The Fish Lake campground is located on Oregon State land and is operated and managed by the BLM. The BLM has a permanent easement from ODFW for the campground. These sites are linked by the 67-mile Steens Mountain Back Country Byway. The Desert Trail provides back country hiking opportunities as it winds for 60 miles through the area. The Steens Mountain Back Country Byway was used by 18,950 visitors to the area in 1975; 45,585 in 2000; and 47,947 in 2001. During the winter months, vehicle access to the snow line on the North Loop Road is allowed by permit only. Foot traffic past the locked gates does not require a permit.

2.19.2.1 Recreation Activities

Recreation sites are used both as staging areas for dispersed uses such as hunting, hiking, and nature study, and as destination points. Steens Mountain affords spectacular geologic features and wide-open space where wildlife is abundant and vegetation diverse, providing outstanding recreation opportunities within a relatively undeveloped landscape.

Numerous trails exist in the Steens Mountain CMPA including Wildhorse Lake, Little Blitzen Gorge, Big Indian Gorge, Steens Summit and the Blitzen River "fishing path." Trails are generally open from June to late October. The Wildhorse Lake trail starts at the Steens Mountain Summit Area and is 1.5 miles long from there to the high elevation lake. The trail is not maintained and is unsuitable for horses because of slick footing and dangerous cliffs. This trail had a minimum of 683 visitors in 2001 who used it for hiking/walking, backpacking, and fishing. The Little Blitzen Gorge trail starts at the South Steens area near South Steens Campground. It is approximately nine miles in length and is maintained on a limited basis. There were at least 326 visitors to this trail in 2001 who used it for hiking/walking, backpacking, fishing, and horseback riding. The Big Indian Gorge trail also starts near the South Steens Campground. It is maintained on a limited basis, and is approximately seven miles long. At least 408 people took advantage of the trail in 2001 for hiking/walking, backpacking, fishing, horseback riding and hunting. The Steens Summit trail begins near the top of Steens Summit and follows the closed road to the highest point on Steens Mountain. It is one half mile in

length. The Blitzen River "fishing path" begins at Page Springs Campground.

Four developed campgrounds in the Steens Mountain CMPA are Page Springs, Fish Lake, Jackman Park, and South Steens. The developed campgrounds include amenities such as picnic tables, drinking water, fire rings and vault toilets. In addition, there are campground amenities provided specifically for equestrian use at South Steens and a boat ramp and fishing platform at Fish Lake. A primitive campground is located at Mann Lake and dispersed camping is allowed throughout the Steens Mountain CMPA.

Page Springs campground is located four miles east on the Steens Mountain Back Country Byway from Frenchglen. The campground is located near the Donner und Blitzen Wild and Scenic River at 4,200 feet. A day use area is also located here.

Fish Lake campground is located 17 miles east from the north entrance at Frenchglen on the Steens Mountain Back Country Byway. The campground is located in an aspen grove at 7,400 feet. Only non-motorized boats are allowed on Fish Lake.

The Jackman Park campground is a small campground located in an aspen grove three miles from Fish Lake at 7,800 feet.

South Steens campground is located eighteen miles east on the Steens Mountain Back Country Byway from Highway 205. The campground was built in 1996 and is located in a juniper grove at an elevation of 5,300 feet.

Mann Lake has a 335-acre primitive campground with sites dispersed in two areas near the reservoir. The campground has vault toilets and a boat ramp. It is located approximately 22 miles south off Highway 78 on Fields-Denio Road (aka Folly Farm Road). The lake is stocked with Lahontan cutthroat and rainbow trout. Boats with 12 horsepower motors or less are permitted.

Fees are collected at developed campgrounds approximately from April through October and are returned to the site for improvements, facility maintenance, and visitor services as part of the Pilot Fee Demonstration Program. In 1995, Congress authorized the Recreational Fee Demonstration Program. The intent of the program is to develop and test entrance and user fees to maintain and improve the natural resource, recreation facilities, and services. Participating agencies are allowed to retain all the demonstration project revenues, and at least 80 percent of the revenues are utilized at the sites where they are collected. These revenues yield substantial benefits by providing on-the-ground improvements at local recreation sites.

2.19.2.2 Off-Highway Vehicles

The OHV designations for the Steens Mountain CMPA previous to the passage of the Act were 80,000 acres of open, 274,800 acres limited to existing roads, 300,800 acres limited to designated routes and 6,900 acres of closed areas. Due to the creation of the Steens Mountain CMPA and the Steens Mountain Wilderness mandated by the Act, additional areas have been excluded from OHV use. The revised mandates for OHV use in the Steens Mountain CMPA are stated in Section 112(b) of the Act as follows:

> (1) PROHIBITION. – The use of motorized or mechanized vehicles on Federal lands included in the Cooperative Management and Protection Area –
>
> > (A) is prohibited off road; and
> >
> > (B) is limited to such roads and trails as may be designed for their use as part of the management plan.
>
> (2) EXCEPTIONS. – Paragraph (1) does not prohibit the use of motorized or mechanized vehicles on Federal lands included in the Cooperative Management and Protection Area if the Secretary determines that such use –
>
> > (A) is needed for administrative purposes or to respond to an emergency; or
> >
> > (B) is appropriate for the construction or maintenance of agricultural facilities, fish and wildlife management, or ecological restoration projects, except in areas designated as wilderness or managed under the provisions of section 603(c) of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1782).

2.19.2.3 Recreation Planning and Management

Special Recreation Permits

The BLM manages organized or commercial recreation through Special Recreation Permits. In 2001, eight commercial permits were issued for the Steens Mountain CMPA. Commercial activities available included horseback tours, fishing, hunting, winter

recreation, scenic tours, and a runners training camp. According to the IMP and in adherence to the Act, existing special recreation use permits will continue to the extent they are consistent with the purposes of the Act and the Wilderness Act. Stipulations may also be developed on current Burns District Special Recreation Permits (SRPs) with permitted activities within the Steens Mountain CMPA to assure consistency with the Act. Wilderness-specific permit stipulations may also be developed, if necessary to assure permit compliance with the Wilderness Act. SRPs will be administered in conformance with the Act and with applicable laws, policies, and plans. Commercial Day Use permit stipulations will be developed as appropriate to assure consistency with the Act.

Special Recreation Management Areas and Extensive Recreation Management Areas

Current management guidelines are provided in the Act, the Andrews MFP, and the Wilderness IMP for the Steens Mountain CMPA. According to the Act and the IMP, recreation will continue to be managed in a manner consistent with the purposes of the Act, the Wilderness Act, the Wild and Scenic Rivers Act, and other applicable existing land use plans and regulations. In addition, recreation facilities will continue to be maintained to provide a quality recreation experience and to protect the health and safety of the visiting public.

2.20 Visual Resources

The FLPMA requires the BLM to consider the effects of management actions on the visual quality of the landscape. To protect visual resources, all public land is inventoried to determine its Visual Resource Management (VRM) classification. The VRM objectives for each of four possible classifications are described below.

Class I-The objective of this classification is to preserve the existing character of the landscape. This class provides for natural ecological changes and limited management activity. The level of change should be very low and must not attract attention. Class I is assigned to those areas where a management decision has been made to preserve a natural landscape. This includes areas such as wilderness, wild sections of National WSRs, and other congressionally and administratively designated areas.

Class II-The objective of this classification is to retain the existing character of the landscape. The level of change to landscape characteristics should be low. Management activities may be seen but should not attract the attention of a casual observer. Any changes must conform to the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape. This class represents the minimum level of VRM for WSAs.

Class III-The objective of Class III is to partially retain the existing character of the landscape. Moderate levels of change are acceptable. Management activities may attract attention but should not dominate the view of a casual observer. Changes should conform to the basic elements of the predominant natural features of the characteristic landscape.

Class IV-The objective of Class IV is to provide for management activities that require major modification of the landscape. These management activities may dominate the view and become the focus of viewer attention; however, every effort should be made to minimize the impact of these projects by carefully locating activities, minimizing disturbance, and designing the projects to conform to the characteristic landscape.

2.20.1 Andrews Management Unit

Public land has been evaluated and assigned visual resource inventory classes according to the relative value of the visual resources. Decisions of this plan will determine the VRM classes under which public land will be managed. Thus, the VRM class specified for management may differ from the class indicated by inventory. All WSAs in the Andrews MU are Class I (Figure 2.13). The northwestern portion of the Andrews MU is Class IV. The area near the road from Frenchglen, through Fields, to Denio is primarily Class III, with some adjacent areas considered as Class IV.

To help maintain the management objective of a VRM class, the BLM's visual contrast rating system is employed for proposed individual projects and activities to help analyze and mitigate visual impacts to the existing landscape. This systematic process uses the basic design elements of form, line, color, and texture to compare the proposed project/activity with the features of the existing landscape.

2.20.2 Steens Mountain Cooperative Management and Protection Area

VRM Class I is assigned to those areas for which a previous decision has been made to maintain a natural landscape. This includes wilderness areas and other congressionally (Steens Mountain CMPA) and administratively designated areas where decisions have been made to preserve a natural landscape. BLM policy includes WSAs until such time as these areas are

designated as wilderness or released by Congress for other uses. Since many WSAs do not necessarily contain exceptionally high scenic values, the primary objective of WSA management is to retain its natural character essentially unaltered by humans during the time it is being managed as a WSA. If the WSA is designated as wilderness, the area would continue to be managed as VRM Class I; however, if the WSA were released, the RMP for the area would need to be amended and appropriate VRM management objectives established. This policy applies to all future plans and plan amendments. The Steens Mountain CMPA is primarily managed as Class I, except for the northwestern portion north of the Steens Mountain Back Country Byway, which is Class II and several scattered Class IV areas (Figure 2.13).

2.21 Human Uses and Values

2.21.1 Harney/Malheur Study Area

The Andrews MU encompasses a large segment of southern Harney County and a portion of southwestern Malheur County. The Steens Mountain CMPA lies entirely within Harney County. Part of the Mineral Withdrawal Area lies within Malheur County and the Vale District's Jordan RA; however, the effects of the withdrawal in that region have been addressed in the SEORMP. To effectively compile an economic profile of the subbasin review area, Harney and Malheur Counties were selected as the analysis unit. The Steens Mountain CMPA is not separated out but is included in the assessment of Harney County within the Harney/Malheur study area.

The primary economic center of Harney County encompasses the cities of Burns and Hines, which are located 290 miles from Portland in Southeastern Oregon. Burns is the county seat of Harney County and the location of many federal, state, and local government offices. Most basic goods and services are available in Burns/Hines. The nearest community with commercial air service is in Redmond, Oregon. No passenger train service to Burns or Hines is available.

The major economic center of Malheur County is the city of Ontario, located on the Oregon/Idaho border. Ontario is characterized by large employers in the food processing and lumber industries. The nearest community with commercial air service is Boise, Idaho. Passenger train service is provided by Union Pacific.

Several smaller communities are located within the Andrews MU, including Frenchglen and Fields. Services for residents and visitors are limited, but do include fuel, campground, motel or resort facilities, a small store, a restaurant, and one or two churches.

2.21.1.1 Economic Findings from the ICBEMP

The ICBEMP examined the Harney and Malheur County areas generally and the communities of Ontario, Burns, and Hines specifically. Smaller unincorporated communities were not examined. The Draft Eastside EIS concludes that Harney County, located in the Boise trade center, is an area of low economic and social resiliency. This determination is based on the county's dependence on public land timber and forage and the fact that 21 percent of the county budget is derived from federal land payments (USFS and BLM May 1997). Forest Service lands are eight percent of the land base while BLM lands represent 62 percent of the land base. The Draft Eastside EIS concludes that Malheur County is also an area of low economic and social resiliency, which is again based on the county's dependence on public land timber and forage and the fact that 1.5 percent of the county budget is derived from federal land payments (ICBEMP May 1997). Malheur County is also located in the Boise trade center. Forest Service lands are 0.1 percent of the land base while BLM lands represent 72.8 percent of the land base.

Burns and Hines are analyzed in the subsequently released document, "Economic and Social Conditions of Communities: Economic and Social Characteristics of Interior Columbia Basin Communities and an Estimation of Effects on Communities from the Alternatives of the Eastside and Upper Columbia River Basin Draft Environmental Impact Statements." In the document, Burns was found to have high timber employment specialization and medium agricultural employment specialization. Hines was found to have very high timber employment specialization and high agricultural employment specialization.

2.21.1.2 Population, Age Distribution, and Ethnicity

Harney and Malheur Counties are among Oregon's least populated counties. Except for Ontario, Burns, Hines, and a few other "urban" centers, the two counties are primarily rural in character. Table 2.19 displays the census population in 2000 for Oregon, Harney County, Burns, Hines, and for Malheur County and Ontario.

Table 2.19: Census Population in 2000

Geographic Area	Population (2000)
Oregon	3,421,399
Harney County	7,609
Malheur County	31,615
Burns	3,064
Hines	1,623
Ontario	10,985

In Harney County's population, a relatively high percentage is age 65 or older. In 2000, there were 1,141 individuals 65 or over, comprising 15 percent of the population compared to 12.8 percent for the state of Oregon; 26 percent of the population was under 18 and Harney County's median age in 2000 was 38.9. Age distribution for the state in 2000 showed a slightly younger population trend overall; in Oregon, 24.7 percent of the population was under 18 and the median age was 36.3.

Malheur County has a slightly younger population, with 4,321 individuals 65 or over making up 13.7 percent of the total population; 27.6 percent of the population in 2000 was under 18 and the median age was 34.

Harney County has limited ethnic diversity with small populations of Hispanic and Native American residents. Agricultural activities in Harney County are not considered highly labor intensive, and are limited primarily to production of hay, forage, and livestock. This may be one reason for the lower hispanic populations. Malheur County has a much higher Hispanic population, which may be attributed to more labor intensive agriculture and food processing. Table 2.20 shows the approximate population percentages (for individuals recorded under the single race heading in the 2000 census data) for the White, Native American and Hispanic sectors of the population in Harney and Malheur Counties, as well as the state of Oregon.

The Burns-Paiute Tribe has a small reservation in Harney County, located near Burns. The tribe was established by Executive Order instead of by treaty and has no reserved treaty rights (Hanes 1999). Tribal members may particpate in traditional cultural practices such as hunting, fishing, and gathering plants on BLM lands. The Native American Traditional Values associated with this region are discussed in the Cultural Resources Section of this Document.

2.21.1.3 Employment and Wages

In 1998, an estimated 3,680 people were employed in Harney County. This includes 870 self-employed persons. Wage and salary workers were more common, totaling 2,810. Major manufacturing employers, SMC and Louisiana Pacific, are located in the Burns/Hines area, outside the Planning Area. Manufacturing employed 550 people in Harney County (State of Oregon, Employment Department, various years).

Federal, state, and local governments employed the greatest number of people at 1,020 (State of Oregon, Employment Department, various years). During fiscal year 1995, federal natural resource agencies in Harney County employed 60 people at the BLM and 74 at the Forest Service (ICBEMP, February 1998).

The trade sector employed 570 people in 1998, up 16.3 percent from 1990 figures. The services sector employed 410 people, up 36.7 percent since 1990; however, growth in the trade and services sectors has been below the statewide trends, with trade up 22.6 percent and services up 40.7 percent. Overall, Harney County has been experiencing growing employment; unemployment has been decreasing since 1996 (State of Oregon, Employment Department, various years).

Malheur County employment in 1999 was 13,507, up from 13,330 in 1998. Although employment has increased from 1997 to 1998, unemployment has gone up to 8.9 percent (State of Oregon, Employment Department, various years). There has been an influx of the labor force during the past four years, but employment is not keeping pace.

Table 2.20: Population Percentages in Harney and Malheur Counties

Geographic Area	Race	Percent of Population [1]
Oregon	White	78.6
	Hispanic	8.0
	American Indian and Alaska Native	1.3
Harney County	White	87.7
	Hispanic	4.2
	American Indian and Alaska Native	4.0
Malheur County	White	50.2
	Hispanic	25.6
	American Indian and Alaska Native	1.0

[1] Population percentages do not include responses from the two or more race category in the 2000 census data; rather, they were derived from the single race category. For Oregon, 96.9 percent of the population is accounted for in the single race category and 97.9 percent and 97.4 percent of the populations are accounted for Harney and Malheur respectively.

2.21.1.4 Per Capita Income and Poverty Rates

The per capita personal income in Harney County was $21,173 in 1999, lower than Oregon's statewide level of $26,958. Harney County also has a higher portion of income derived from transfer payments (19 percent) than the state as a whole (13 percent). Transfer payments include Social Security, Aid to Families with Dependent Children, unemployment compensation, disability, and other government payments. Typically, transfer payments are a major source of income for retirees and low-income people. Total income derived from dividends, interest, and rent (22 percent) in Harney County was the same as that type of income statewide (22 percent). This income represents returns on accumulated assets held by individuals and is often a large portion of income for the self-employed and retirees. Earned income, typically wages and salaries, was 48 percent of income in Harney County, significantly below the statewide proportion of 56 percent (Oregon Employment Department, No Date).

The per capita income in Malheur County for 1999 was $19,530, lower than that of the state or Harney County. The portion of income derived from transfer payments in Malheur County was 20 percent and the income derived from dividends, interest and rent was 25 percent. Nevertheless, 1999 earned income in Malheur County in the form of wages and salaries made up 57 percent of total income, significantly higher than Harney County and slightly higher than the state.

2.21.1.5 Economic Activity Generated by Public Land Resources

The BLM and other federal land management agencies often make commodities available for use by the private sector. Both the BLM and USFS make rangelands available to private ranching concerns on a renewable permit basis. A fee is collected for each grazing head of livestock. Similarly, the BLM and Forest Service sell timber to private firms; however, no USFS lands or other commercial forest lands exist in Harney County within the Andrews MU. For this reason, timber harvests from BLM land within the Andrews MU have not been a significant source of economic revenue.

Agriculture in Harney County focuses on these products: (1) beef, which earned $33,014,000 in 2000 and (2) Alfalfa, with 2000 earnings at $9,059,000 (Oregon Agricultural Information Network (OAIN) 2000). In Malheur County, dry storage onions have surpassed cattle as the highest grossing agricultural commodity at $68,765,000 in 2000. The cattle industry earned $63,317,000 in 2000 (OAIN 2000). This shift, however, does not necessarily represent a decrease in the commodity value of public rangelands associated with the livestock grazing and the cattle industry.

Total gross farm sales in Harney County totaled $50,418,000 in 2000 (OAIN 2000). Crop sales were $14,075,000 and animal product sales made up the rest ($36,343,000). Total gross farm sales in Malheur County were $193,733,000 in 2000. Of this,

$121,226,000 was in crop sales and $72,507,000 came from animal product sales.

The tourism industry in this area is small compared to other Oregon regions; however, tourism in Harney and Malheur Counties provides a critical monetary inflow to the economies. For people seeking outdoor recreation and solitude, public lands in Harney and Malheur Counties have much to offer. A 2001 report prepared for the Oregon Tourism Commission estimated that travel-related spending in Harney County totaled $18,000,000 with $2,500,000 attributed to travelers staying in public campgrounds during 2000. In Malheur County, travel spending for 2000 was $34,900,000 with $2,500,000 attributed to travelers staying in public campgrounds. Travel is responsible for 6.5 percent of the employment in Harney County and 3.2 percent in Malheur County.

2.22 Lands and Rights-of-Way

2.22.1 Andrews Management Unit

The BLM administers public lands in the Andrews MU, which is located in Harney and Malheur Counties. According to available GIS data, the approximate percentages of surface area administration/ownership within the Andrews MU are as follows: BLM - 73 percent, USFWS - 1.6 percent, State of Oregon (Division of State Lands, ODFW) - 0.4 percent, and privately owned - 25 percent (see Table 2.21). All the private land in the Andrews MU is zoned by Harney County for exclusive farm and range use (EFRU-1) except the areas at Frenchglen and Fields, Oregon, which are zoned rural service center (RSC).

2.22.1.1 Administrative Sites

BLM administrative sites in the Andrews MU are the Frenchglen Fire Guard Station and the Fields Administrative Site.

2.22.1.2 Land Retention, Acquisition and Disposal

BLM lands are divided into three zones that identify the public land for potential land tenure adjustments (e.g., acquisition or disposal), consistent with existing regulations and BLM policy. FLPMA Section 102.(a)(1) provides that

"...the public lands be retained in Federal ownership unless as a result of the land use planning procedure provided for in this Act, it is determined that disposal of a particular parcel will service the national interest..."

Zone 1 land has been identified for retention in public ownership. These are also areas where emphasis will be placed on acquisition of land containing high public resource values. Zone 2 land has been identified for limited retention and consolidation of ownership. Zone 3 land generally has lower resource value and has been determined difficult and uneconomic to manage. Methods for implementing land disposal actions include the following: (a) BLM and other federal jurisdictional transfers; (b) transfers to state and local agencies (e.g., Recreation and Public Purpose (R&PP) patents, in-lieu selections, airport patents); (c) state exchanges; (d) private exchanges; (e) sales; (f) Indian allotments; and (g) desert land entries.

Current GIS data show approximately 1,711,135 acres designated as Zone, 1,394,709 acres designated Zone 2 and 38,635 acres designated Zone 3 within the Planning Area. There are also 33,327 acres that are not designated. Land management requirements in the Act such as land exchanges and WSA boundary adjustments create inconsistencies between the current land tenure designations and legislative requirements. These inconsistencies will be addressed through the RMP/EIS. Figure 2.14 depicts the Land Tenure Zones for the Planning Area.

2.22.1.3 Withdrawal Areas

The Mineral Withdrawal Area designated by the Act encompasses the entire Steens Mountain CMPA and Steens Mountain Wilderness. Subject to valid existing rights, no mining or exploration will be permitted anywhere in the Steens Mountain CMPA. Exceptions are the existing gravel operations within the Steens Mountain CMPA, which are permitted by the Act as follows: Section 401.(b) of the Act "... The Secretary may permit the development of salable mineral resources, for road maintenance only, in those locations identified ... as an existing 'gravel pit' within the mineral withdrawal boundaries (excluding the Steens Mountain Wilderness, WSAs, and designated segments of the National Wild and Scenic River System) where such development was authorized before the date of enactment of this Act."

Section 113(g) of the Act also withdraws all lands within the Steens Mountain CMPA from all forms of entry except "land exchanges that further the purposes and objectives specified in Section 102" of the Act. WSRs and Wilderness also carry with them their own withdrawals made under the terms of the Wilderness and Wild and Scenic Rivers Acts. For these reasons the Steens Mountain CMPA, depending upon the location, may have a variety of overlapping duplicate withdrawals.

Table 2.21: Land Ownership and Administration in the Andrews MU

Land Ownership/Administration	Acres
BLM	1,221,316
U.S. Fish and Wildlife	26,677
Private (including county)	427,105
State of Oregon	6,577
Total	**1,681,675**

2.22.1.4 Access

Many roads or segments of roads crossing private lands in the Steens Mountain CMPA have no provision for legal public access. Together with the access restrictions provided in the Act, this situation may severely limit legal public access to significant portions of public land within the Steens Mountain CMPA. Over time, the BLM has acquired public access easements on a few major roads such as the Steens Mountain Back Country Byway. More recently, land exchanges authorized by the Act have secured public access easements on several private road segments.

As discussed in previous sections, the Act specifies that "reasonable access" will be provided to private and state landholdings within the boundaries of the Steens Mountain CMPA and the Steens Mountain Wilderness. Creating the Steens Mountain CMPA and implementing the wilderness regulations have raised access issues to the forefront of management planning. The Act and the BLM IMP for lands under Wilderness Review will guide access and use of the roads/transportation; however, the Transportation Plan, as well as the RMP/EIS, will address further the issue of access and will also outline specific protocols and objectives.

2.22.1.5 Rights-of-Way and Land Use Authorizations

Although the Act does not specifically prohibit grants of new ROWs or land use authorizations, many of its provisions would limit the number and type of grants. An example is the Act's prohibition of road construction and facilities. Valid existing rights are protected under the Act. Regarding ROWs, the Act specifically states that "nothing in this Act shall have the effect of terminating any valid existing ROW on Federal lands included in the Cooperative Management and Protection Area."

Existing ROWs within the Steens Mountain CMPA are primarily limited to small scale electric and telephone distribution lines. Access roads across public lands to private lands generally have no recorded rights associated with them. Use of these roads by landowners and others is considered "casual use" where no authorization is needed as long as such use does not cause appreciable disturbance to the public lands, its resources or improvements. No well maintained county roads or state or federal highways are within the CMPA, although these roads and highways comprise significant portions of the Steens Mountain CMPA boundary. Likewise, there are no designated ROW corridors within the Steens Mountain CMPA.

Film permits and wilderness access permits under 43 CFR 2920 are the primary type of land use authorizations that have been granted or might potentially be proposed.

2.22.2 Steens Mountain Cooperative Management and Protection Area

Table 2.22 depicts the various land ownership in the Steens Mountain CMPA. Private land is dispersed throughout the area but larger parcels and/or concentrations occur in the northern and southern thirds. The primary use of the private land is cattle ranching and grazing. Other uses include recreation, hunting, small business, and agriculture with native hay as the primary crop. Although many of these residents rely on their private land and adjacent BLM land for their livelihood, most are absentee owners of small parcels of 160 acres or less. All the private land in the Steens Mountain CMPA is zoned by Harney County for exclusive farm and range use (EFRU-1).

Table 2.22 : Land Ownership and Administration in the Steens Mountain CMPA

Land Ownership/ Administration	Acres
BLM	428,153
Private	66,913
State of Oregon	1,070
Total	**496,136**

2.22.2.1 Land Retention, Acquisition and Disposal

Current GIS data show Zone 1 designated areas through the central and northeastern portion of the Steens Mountain CMPA. Zone 2 and Zone 3 areas in the Steens Mountain CMPA occur in the extreme northern and southern portions and are depicted on Figure 2.15. Land management requirements of the Act, such as land exchanges, wilderness and WSA boundary adjustments, create inconsistencies between the current land tenure designations and legislative requirements. For example, there are now Zone 3 (disposal) lands within the Steens Mountain Wilderness. These inconsistencies will be addressed through the RMP/EIS.

One specific purpose of the Act (Section 1(b)(4)) was to "provide for the acquisition of private lands through exchange for inclusion in the Steens Mountain Wilderness and the [CMPA]." In order to do this, a number of specific land exchanges were outlined in the Act and carried out by the BLM. Lands acquired within the Steens Mountain CMPA became part of the Steens Mountain CMPA and are managed under its laws and management plans. Lands acquired in the Steens Mountain Wilderness and WSAs came under those designations and are managed as such. The Act also allows for additional future acquisitions of private lands in the Steens Mountain CMPA, the Steens Mountain Wilderness, and the WSAs, which will be classified and managed accordingly. A revised land tenure plan will be developed during the RMP/EIS planning process.

2.22.2.2 Withdrawal Areas

The Mineral Withdrawal Area designated by the Act encompasses the entire Steens Mountain CMPA and Steens Mountain Wilderness. Subject to valid existing rights, no mining or exploration will be permitted anywhere in the Steens Mountain CMPA. Exceptions are the existing gravel operations within the Steens Mountain CMPA, which are permitted by the Act as follows: Section 401.(b) of the Act "... The Secretary may permit the development of salable mineral resources, for road maintenance only, in those locations identified ... as an existing 'gravel pit' within the mineral withdrawal boundaries (excluding the Steens Mountain Wilderness, WSAs, and designated segments of the National Wild and Scenic River System) where such development was authorized before the date of enactment of this Act."

Section 113(g) of the Act also withdraws all lands within the Steens Mountain CMPA from all forms of entry except "land exchanges that further the purposes and objectives specified in Section 102" of the Act. WSRs and Wilderness also carry with them their own withdrawals made under the terms of the Wilderness and Wild and Scenic Rivers Acts. For these reasons the Steens Mountain CMPA, depending upon the location, may have a variety of overlapping duplicate withdrawals.

2.22.2.3 Access

Many roads or segments of roads crossing private lands in the Steens Mountain CMPA have no provision for legal public access. Together with the access restrictions provided in the Act, this situation may severely limit legal public access to significant portions of public land within the Steens Mountain CMPA. Over time, the BLM has acquired public access easements on a few major roads such as the Steens Mountain Back Country Byway. More recently, land exchanges authorized by the Act have secured public access easements on several private road segments.

As discussed in previous sections, the Act specifies that "reasonable access" will be provided to private and state landholdings within the boundaries of the Steens Mountain CMPA and the Steens Mountain Wilderness. Creating the Steens Mountain CMPA and implementing the wilderness regulations have raised access issues to

the forefront of management planning. The Act and the BLM Interim Management Policy for lands under Wilderness Review will guide access and use of the roads/transportation; however, the Transportation Plan, as well as the RMP/EIS, will address further the issue of access and will also outline specific protocols and objectives.

2.22.2.4 Rights-of-Way and Land Use Authorizations

Although the Act does not specifically prohibit grants of new ROWs or land use authorizations, many of its provisions would limit the number and type of grants. An example is the Act's prohibition of road construction and facilities. Valid existing rights are protected under the Act. Regarding ROWs, the Act specifically states that "nothing in this Act shall have the effect of terminating any valid existing ROW on Federal lands included in the Cooperative Management and Protection Area."

Existing ROWs within the Steens Mountain CMPA are primarily limited to small scale electric and telephone distribution lines. Access roads across public lands to private lands generally have no recorded rights associated with them. Use of these roads by landowners and others is considered "casual use" where no authorization is needed as long as such use does not cause appreciable disturbance to the public lands, its resources or improvements. No well maintained county roads or state or federal highways are within the CMPA, although these roads and highways comprise significant portions of the Steens Mountain CMPA boundary. Likewise, there are no designated ROW corridors within the Steens Mountain CMPA.

Film permits and wilderness access permits under 43 CFR 2920 are the primary type of land use authorizations that have been granted or might potentially be proposed.

2.23 Geology

2.23.1 Andrews Management Unit

The Basin and Range province consists of a series of nearly parallel, generally north trending, fault-block mountains (horsts) and intervening broad valleys (grabens). Drainage is generally internal with no outlet to the sea, with an exception in the northeast portion of the Andrews MU where a drainage is a tributary to the Snake River.

Pre-Tertiary rocks in the Andrews MU are limited to the Pueblo Mountains and consist of Mesozoic rocks thought to be part of an accreted terrain. The presence of rounded quartzite cobbles in the Mesozoic rocks suggests that part of the Precambrian pluton may underlie the Pueblo Mountains (Evans 1994).

Lower and mid-Miocene rocks are exposed at the base of the Steens Mountain escarpment. They are primarily rhyolite and andesite and are locally mineralized.

The Basin and Range province began to evolve in the middle Miocene (18 million years ago) as a result of regional, generally east-west extension. The regional extension was accompanied by extrusion of Steens Basalt lava flows approximately 16 million years ago over an area 100 by 180 miles that includes all of the Andrews MU.

Approximately 15 million years ago, caldera-forming eruptions occurred in the Pueblo and Whitehorse calderas and calderas in the McDermitt complex, resulting in welded tuffs in the eastern part of the Andrews MU. Caldera-forming eruptions occurred again 9.5 million years ago and 6.5 million years ago from vents in the Burns/Harney Lake area. The eruptions resulted in welded tuffs in the northern half of the Andrews MU (Devine Canyon Ash-flow Tuff) and northwest part of the Andrews MU (the pumice-rich Rattlesnake Ash-flow Tuff).

Beginning approximately ten million years ago and continuing to the present, the regional extension was accompanied by regional uplift and extensional faulting, resulting in present day topography. Total stratigraphic offset on the fault zone east of the Pueblo Mountains is approximately 15,000 feet and total offset on the fault zone east of Steens Mountain is approximately 10,000 feet. Erosion has occurred over the years, resulting in topographic offset of approximately 5,000 feet between the Alvord Valley floor and the top of Steens Mountain. The Alvord Valley contains more than 1,000 feet of sediment eroded from the surrounding mountains and hills.

Less than a million years ago, a glacial cap formed on Steens Mountain (the Fish Lake glacial advance) and then glaciers formed in the valleys on Steens Mountain (the Blitzen glacial advance). Between 24,000 and 12,000 years ago, pluvial lakes occupied Alvord, Blitzen, and Catlow Valleys. The lakes formed due to increased precipitation and slightly warmer temperatures from a climate change that occurred several thousand years after the glaciers were at their peak. During this time, landslides formed along the east side of Steens Mountain along slip planes in tuffaceous sediments, and ancient Lake Alvord spilled eastward into the Coyote Lake area through Big Sand Gap.

2.23.2 Steens Mountain Cooperative Management and Protection Area

Steens Mountain is a fault-block mountain that dips gently westward and is characterized by its precipitous east-facing 5,500-foot high escarpment overlooking Alvord Valley. The elevation of 9,500 feet allowed the formation of alpine glaciers less than one million years ago on the eastern edge of Steens Mountain. Gorges carved by the glaciers are 2,000 feet deep and expose layers of the Steens Basalt, which is approximately 3,000 feet thick in this area. Mid and Lower Miocene rocks are exposed at the base of the east-facing escarpment.

2.24 Energy and Mineral Resources

The BLM manages energy and mineral resources on 1,549,00 acres of land that has federal surface and federal subsurface (mineral estate) ownership within the Planning Area ("Public Land" in Table 2.23). The BLM manages a total of 72,000 acres of land with nonfederal surface and federal subsurface ownership within the Planning Area. The BLM manages a total of 1,000 acres of land with nonfederal surface and partial federal subsurface ownership (ownership of specific mineral resources such as oil and gas resources) in the Planning Area. There is nonfederal subsurface ownership on 552,000 acres of land within the Planning Area, which is 25 percent of the land. Detailed information is on master title plats available in each BLM DO. Figure 2.15 shows surface and subsurface (mineral estate) ownership in the Planning Area. On the map, the mineral estate ownership is the same as the surface estate ownership unless there is an inclined line pattern showing that the land is split estate. The patterned land has federal mineral estate ownership if the surface is nonfederal (white or blue) and the patterned land has nonfederal mineral estate ownership if the surface is federal (tan or yellow). Wind may be considered for power generation in the Planning Area, but is not covered in this document.

2.24.1 Leasable Minerals

This mineral category includes oil and gas, coal, geothermal and sodium mineral resources. The BLM has developed four categories to manage leasable minerals in a manner that minimizes conflict with other resource values: (1) open to leasing subject to standard terms and conditions; (2) open to leasing subject to special stipulations that may include seasonal No Surface Occupancy (NSO), other timing limitations, or special stipulations (controlled surface use limitations); (3) open to leasing subject to NSO; and (4) closed to leasing.

No oil, gas, or coal resources have been documented in the Planning Area. A Known Geothermal Resource Area (Alvord KGRA) exists that is entirely within the Mineral Withdrawal Area. Twelve deep (greater than 1,000 feet) geothermal wells were drilled within this KGRA. Rose Valley Borax Company mined borax in the area south of Alvord Lake 100 years ago. The borax mining operation lasted for ten years and shut down when sodium borate levels fell below economic levels. Currently, there are no mineral leases in the Planning Area.

Mineral potentials for leasable mineral resources are shown on Figure 2.17. Potential is low for oil and gas resources throughout the Planning Area. High potential for geothermal resources exists in the KGRA and in the area to the east of the KGRA; the rest of the Planning Area has moderate potential for geothermal resources. Sodium mineral resources have high potential in the Alvord Lake area and low potential outside that area.

2.24.2 Locatable Minerals

Locatable minerals in the Planning Area are gold, mercury, uranium, diatomite, copper, molybdenum, and sunstones. Exploration is sporadic and currently only one exploration/mining area is active, containing sunstones.

The potential is high for hot-springs type gold and mercury deposits in the Lone Mountain area (in the northwestern part of Andrews MU), in the area between the community of Andrews south through the Pueblo Mountains, on the east side of Steens Mountain in the Alvord Hots Springs area, in the Flagstaff Butte area, and in the southeastern corner of the Planning Area. The east side of Steens Mountain and the Flagstaff Butte area also have high potential for uranium. Part of the Flagstaff Butte area has moderate potential for diatomite. The Pueblo Mountains and Pueblo Valley areas have moderate potential for gold in quartz veins. The Pueblo Mountains have moderate to high potential for porphyry deposits of copper, gold and molybdenum. In October 2001, 37 mining claims were in the Planning Area; six are grandfathered claims within the Mineral Withdrawal Area east of the CMPA.

Locatable mineral resource potentials are shown on Figure 2.17. This map also shows the location of the Mineral Withdrawal Area. Table 2.24 summarizes the number of acres with high, moderate, or low potentials for selected leasable and locatable minerals. The table acreages include lands within the Mineral Withdrawal Area and non-BLM administered lands. The table shows acreages for moderate and low potential for hot springs gold/mercury and for uranium. That information

Table 2.23: Mineral Ownership by County

Andrews RMP Planning Area	Malheur	Harney	Total
Planning Area			
Public land[1]	103	1,446	1,549
All minerals reserved[2]	2	70	72
Partial minerals reserved[3]	0	1	1

[1]Public Land = Surface and mineral estates both under BLM administration.
[2]All Minerals Reserved = Nonfederal surface, 100 percent federal mineral estate.
[3]Partial Minerals Reserved = nonfederal surface, less than 100 percent federal mineral estate.

Congressional action has closed a total of 1,181,362 acres in the Planning Area to mineral leasing in the Mineral Withdrawal Area, Steens Mountain Wilderness, WSAs and designated WSRs. Congressional action has also closed 748,119 acres to mineral location under the 1872 Mining Law in the Mineral Withdrawal Area, Steens Mountain Wilderness, and designated wild segments of WSRs. Six grandfathered claims covering 120 acres are located in the Mineral Withdrawal Area. In WSAs outside the Steens Mineral Withdrawal Area covering 433,243 acres, claims may be located but no surface-disturbing mineral activity requiring reclamation will be authorized until congress acts to designate all, part or none of the WSAs as wilderness. Since no pre-1976 claims are in any of the WSAs in the Planning Area, there can be no claims with grandfathered or valid existing rights in these areas.

2.24.3 Saleable Minerals

This group of minerals includes sand, gravel, and rock aggregate. No decorative rock resources have been identified in the Planning Area; petrified wood and obsidian are rare. The Planning area contains large amounts of sand, gravel, and rock aggregate which is generally located in visually or ecologically sensitive areas. Development has been limited to road construction and maintenance projects. The locations of designated sources of saleable minerals on BLM land are shown on Figure 2.16.

2.24.4 Rockhounding

Rockhounds primarily collect agate, thundereggs and sunstones in the Planning Area. No rock collection areas have been designated.

2.24.5 Andrews Management Unit

The Mineral Withdrawal Area designated by the Act extends beyond the Steens Mountain CMPA into part of the Andrews MU and beyond the Planning Area into the Vale District. See Figure 2.16 for the location of the Mineral Withdrawal Area boundary.

Within the Andrews MU are ten designated sand and gravel sources, one rock aggregate source, and two state ROW sites on state highways for use by the Oregon Department of Transportation (ODOT). The right-of way sites are authorized under Title 23 of the Federal Highway Act. Figure 2.16 shows the location of designated saleable mineral sites.

2.24.6 Steens Mountain Cooperative Management and Protection Area

The Mineral Withdrawal Area designated by the Act encompasses the entire Steens Mountain CMPA. No claims or leases exist within the Steens Mountain CMPA.

The Act allows for development of saleable mineral resources for road maintenance only, at locations identified in the Act. Within the CMPA are three designated rock aggregate sources and one sand and gravel source that may be developed. No state ROW sites exist in the Steens Mountain CMPA.

2.25 Cultural Resources

A cultural resource is generally defined by federal agencies as any location of human activity that occurred at least 50 years ago, and that is identifiable through field survey, historical documentation, or oral evidence. American Indian traditional use areas are a special category of cultural resources. Some cultural

Table 2.24: Mineral Potential in Acres

Commodity	Low	Moderate	High	Total[2]
Leasables[1]				
Oil and gas	2,178	0	0	2,178
Geothermal	0	1,613	565	2,178
Sodium/potassium minerals	2,163	0	15	2,178
Locatables				
Hot-springs gold and mercury	442	1,397	339	2,178
Uranium	509	1,559	110	2,178
Vein gold	2,105	73	0	2,178
Copper, gold and Molybdenum (Porphyry)	2,157	14	7	2,178
Diatomite	2,148	0	30	2,178

[1]Variations in acreage totals between leasable minerals are due to differences in the mineral reservations; i.e., in many cases, only one of the leasable minerals (e.g., oil and gas) was reserved.
[2]Acreage includes land within the Mineral Withdrawal Area and non-BLM administered lands.

resources may be less than 50 years old, but have cultural or religious importance to American Indian tribes or paramount historic interest to the public.

Prehistoric, or precontact, cultural resources include lithic scatters, rock shelters, pithouses, petroglyphs, hearths, and rock alignments. Historic cultural resources include buildings and building ruins, wagon roads, railroad grades, irrigation ditches and associated structures, dams, and archaeological deposits.

Almost all cultural resource inventories are project-specific, rather than initiated by the Cultural Resource Program; therefore, the surveys are not necessarily in areas of high site potential. Only seven percent or less of the public land in southeastern Oregon has been inventoried for cultural resources. Earlier inventories and site records are sketchy and do not conform with more recently approved data bases of the State Historic Preservation Office or the BLM Cultural Resource Program; however, sites from earlier surveys have been tabulated for their condition at the time of recording when the information was given.

2.25.1 Andrews Management Unit

The archaeological record is extensive in terms of site numbers and age. Evidence exists in the Andrews MU and Steens Mountain of some of the earliest occupation in North America over the past 10,000 years. Prehistoric sites are those older than about 1830 A.D. and include the following: stone flake scatters, habitation sites, toolstone quarries, rock shelters and caves, rock art and rock structures such as rock rings (wickiup supports), and hunting blinds.

Since the late 1970s, a total of 590 cultural properties have been recorded in the Andrews MU (561 prehistoric and 29 historic). Cultural resources have been degraded by natural processes such as erosion and by human actions such as construction and artifact collection. In recent decades, federal agencies have attempted to minimize damage to significant National Register of Historic Places (NRHP) eligible cultural resources.

Federal Antiquity laws require consideration of cultural resource values through consultation, a process designed to encourage protection of cultural properties prior to project approval. This often necessitates intensive surveys and recording where existing data are insufficient to make an assessment. If significant sites cannot be avoided during construction activities, the adverse effects are mitigated through data recovery by excavation, surface collection, photography and recording, and analysis. Table 2.25 shows the condition of sites in the Andrews MU including the Steens Mountain CMPA.

The density of scientifically significant prehistoric sites is high along major streams and rivers, along the margins of pluvial lakebeds, in some dunal areas, and

near springs. Low site density is expected in large areas of the treeless undifferentiated volcanic uplands and in the bottoms of former pluvial lake basins, where surface water and various life-sustaining resources are less prevalent.

2.25.2 Steens Mountain Cooperative Management and Protection Area

The Steens Mountain CMPA is the northernmost extension of the Great Basin and supports a wide variety of environments ranging from true desert (Alvord Desert) to alpine meadows at the top of Steens Mountain. There are opportunities for prehistoric archaeological research. The area has been the focus of continuous work since the late 1970s.

Fur trappers were the first Euro-Americans to visit the Steens Mountain Area in a brief foray in 1826. The next visitors came in the 1840s and 1850s. The area was first permanently settled in the 1870s and the most arable land with water was claimed shortly thereafter. Just after the turn of the 20th century, a brief dry-land farming boom occurred to the west in Catlow Valley. By 1920, most settlers were driven away from the Steens by cold winters, summer frost, and drought. The Riddle brothers, who ranched on the Little Blitzen River, were an exception. They settled this 1,220 acre ranch in the late 1800s and it operated continuously until 1986 when the BLM acquired and designated it a National Historic District.

In the early 20th century, Basque sheep herders moved onto Steens Mountain and surrounding rangeland. They eventually became ranch owners, leaving their marks in the form of place names, cabins, carved aspen, sheep camps and numerous rock cairns.

Historic sites in the Steens Mountain CMPA include wagon roads, homesteads, the town sites of Andrews and Diamond, Basque sheep camps with carved aspen, Rose Valley Borax Works at Borax Lake, and historic trash dumps. The Riddle Brothers Ranch National Historic District is a complex of well preserved historic buildings, several willow fences, corrals, and rock walls. The BLM has restored three of the buildings and stabilized the others. In addition to the historic component, the district contains at least 48 prehistoric sites.

The Steens Mountain area contains 443 archeological sites covering 2,911 acres. Only eight percent of the area has been surveyed for archeological sites and most surveys have been tied to BLM projects. Three extensive surveys in the south and southeast portions of the Steens Mountain area account for most of the survey acres and site discoveries.

2.26 Native American Traditional Values

2.26.1 Andrews Management Unit

No Native American subsistence areas have been identified. Prior to non-Native American settlement, the area was occupied and used by Northern Paiute bands. Many of their descendants now live on the Burns Paiute Reservation in Burns, Oregon; the Warm Springs Reservation in Warm Springs, Oregon; and the Fort McDermitt Reservation in McDermitt, Nevada. Resources traditionally used include edible roots such as biscuitroot, camas, and onions; goosefoot and Indian ricegrass seeds; red osier dogwood; willow; quaking aspen posts for working on animal hides; black lichens found in conifer forests; basketry grasses; chokecherries; currants; mountain mahogany; and obsidian, basalt, and cryptocrystalline silicate toolstone sources. Sacred sites, significant landforms, and traditional resource sites may be present of which the BLM is unaware. BLM staff has no record of complaints filed under the environmental justice program by Native Americans concerned about the effects of BLM plans, programs, or policies in the Planning Area.

2.26.2 Steens Mountain Cooperative Management and Protection Area

Prior to Euro-American settlement (ca.1870), the Steens Mountain CMPA was occupied and used by the Northern Paiute people. According to the Burns Paiute Cultural Resource Manager, the mountain served as a hideout or refuge during and after the Bannock War of 1878. Many of the descendants of this aboriginal people now live on the Burns Paiute Reservation in Burns, Oregon; Warm Springs Reservation in Warm Springs, Oregon; and the Fort McDermitt Reservation in McDermitt, Nevada.

Resources traditionally used in the Steens Mountain CMPA include a wide variety of plant and animal foods, as well as materials for making tools and shelter. Edible roots include biscuitroot, bitteroot, camas, carrots and onions. Available in the area are seeds of goosefoot, Indian rice grass and Great Basin wild rye, and berries such as chokecherry, currants and elderberry. Game animals include various waterfowl, trout and chub, antelope, and big horned sheep, which are found in specific habitats in the Steens mountain area. Other game such as mule deer, waterfowl, sage-grouse, rabbit, ground squirrel, and marmot have more

Table 2.25: Archaeological Site Condition

Resource Area	No Report	Excellent	Good	Fair	Poor	Destroyed	Total
Andrews Management Unit	17	39	64	13	11	3	147
Steens Mtn. CMPA	52	118	193	38	31	11	443

widespread distribution. Plants such as red osier dogwood, willow, tules, and cattails are found in riparian or marshland settings, while grasses for basketry are encountered in upland and sand dune environments. The wide bands of quaking aspen on the mid-slopes of Steens Mountain are sources of posts for hide working, and mountain mahogany for bows and digging sticks grows on the rocky ridges at and above the juniper zone. Obsidian, basalt and agate chert toolstone sources are found at various locations in the Steens Mountain CMPA.

According to the Burns Paiute Tribal Cultural Resource Manager, resource areas used by Tribal members and known Tribal historic sites do exist in the Steens Mountain area; however, this information has not been released to the BLM because of data adequacy concerns.

Some of the Burns Paiute Elders refer to Steens Mountain as "Old Man." Even though Steens Mountain was and is a dominant landform in their world, no known religious sites exist in the area.

2.27 Paleontological Resources

Paleontological resources are defined as the fossilized remains of plants and animals. Fossils are of Pliocene, Miocene, and Pleistocene age and are located in various volcanic tuff, sandstone, siltstone beds or Pleistocene gravels. Of particular interest are vertebrate fossils such as those of extinct camels, mammoths, giant sloths, turtles, and horses.

2.27.1 Andrews Management Unit

Fossil localities have been reported on public land in the Andrews MU. Most of the finds have been exposed by wind or water erosion, and are widely dispersed, situated primarily along maintained county or BLM roads. Several localities are the subject of ongoing academic research.

2.27.2 Steens Mountain Cooperative Management and Protection Area

Small exposures of Miocene sedimentary rocks are exposed at the base of the east face of Steens Mountain, west of the Folly Farm Road. Known locations of plant fossils are on private and public land, as well as several unexplored exposures that are likely to contain animal fossils.

A survey of known paleontological localities was conducted in May of 1999 within and near the Steens Mountain CMPA. Animal remains from sabertooth cats, mastodons, giant camels, small camels (llama-like), horses and horned rodents were found. A plant locality within the area was reassessed and yielded a flora composed of the following plants: true fir, spruce, pine, Douglas fir, juniper, cottonwoods, willow, hornbeam, barberry, serviceberry, mountain mahogany, *Photinia* sp., cherry, rose, mountain ash, indigo bush, sumac, maple, buckbrush, and madrone. This flora would normally occur in a small lake environment in a slightly warmer, more temperate climate than exists in the area today.

A new fossil locality was found in the fall of 1999 in Catlow Valley west of the Steens Mountain CMPA. Animals identified in the preliminary analysis are beaver, pecarry, camel and cat. This find dates to the late Miocene to early Pliocene period (five to seven million years ago) and indicates that the Catlow Valley was much wetter than it is today.

These fossil localities, especially the known and potential animal localities, are highly significant in that they are a window to the environment existing millions of years ago. They are nonrenewable, extremely fragile, and very small in areal extent. The precise number of acres encompassed by these localities is unknown because they have not been completely described and mapped.

2.28 Hazardous Materials

Several sites in the Andrews MU and within the Steens Mountain CMPA contain hazards associated with abandoned mine land. These hazards include shafts, adits, potential hantavirus, potential mercury contamination, and a dynamite cache that was burned by the Oregon State Police bomb squad and which should remain undisturbed while weathering deteriorates any unburned remnants.

Sediment samples were collected throughout the Planning Area and analyzed by the USGS for a suite of elements including mercury and arsenic. The results of the analyses and the abandoned mine land hazard locations are shown on Figure 2.18.

When sites are discovered that are suspected to contain hazardous materials, employees and the public should retreat, report to BLM Dispatch, and restrict access to the area. More information is available in the Burns District Hazardous Materials Recognition and Emergency Response Plan. Actions related to land or minerals are reviewed both internally and externally (if appropriate) for compliance with federal and state regulations and for development of stipulations to safeguard human health and the environment.

Remediation of abandoned mine lands and hazardous materials sites is analyzed in documents specific to those sites and will not be addressed further in the RMP.

2.29 Roads/Transportation

2.29.1 Andrews Management Unit

In the Andrews MU there are several BLM maintained, private, state, and county roads, as well as low standard roads and trails. These roads and trails are important for access to BLM lands and are occasionally maintained by the BLM in support of a special project such as fire rehabilitation. Andrews MU roads are used by BLM personnel for administrative access, by ranchers and other permittees for livestock maintenance, and by the general public seeking recreation opportunities.

Priorities for preventive maintenance in the Andrews MU outside of the Steens Mountain CMPA are established as follows:1) safety of all users, 2) BLM transportation plan roads, 3) roads recovered by a reciprocal agreement with the county or road district, 4) resource protection, 5) high-use roads, 6) roads which are grouped together or more accessible and therefore less costly to maintain, and 7) all other roads.

Corrective maintenance occurs as problems are identified and funds permit. Road construction has been limited to improving or upgrading segments of road to improve access or to alleviate maintenance or environmental problems.

Section 112 of the Act calls for a Comprehensive Transportation Plan to be included in the RMP/EIS. The Transportation Plan will outline the BLM's philosophy toward transportation management and will provide specific guidelines for management of individual roads, as well as general standards for construction, maintenance, and access for the entire Andrews MU road and trail system. In addition, specific guidelines will be outlined for the Steens Mountain CMPA according to the Act. During preparation of the Transportation Plan, road inventories and a road density analysis (as required for ICBEMP planning efforts) will be completed. OHV use and regulations are discussed in the Recreation section of this document.

2.29.2 Steens Mountain Cooperative Management and Protection Area

In 2000, as part of the Act, Congress closed the Steen Mountain Wilderness to motorized or mechanized vehicles, mechanical transport, motorized equipment, and the landing of aircraft. Certain roads within the Steens Mountain CMPA are bounded by Steens Mountain Wilderness on both sides, including the Steens Mountain Back Country Byway, Cold Springs Road, Newton Cabin Road to Big Indian Creek, Fish Creek Road, and portions of Bone Creek Road; however, these roads are not within the Steens Mountain Wilderness itself. All mechanized and motorized vehicle travel is prohibited off existing roads in the Steens Mountain CMPA. The only exceptions to motorized vehicle use in the Steens Mountain CMPA are emergencies and necessary maintenance for wildlife or fish management, ecological restoration, and agricultural facilities. In addition to the permanent road closures and restrictions, sections of the Steens Mountain Back Country Byway are closed during winter.

Roads that border the Steens Mountain Wilderness have specified setbacks from the center of the roads. High Standard Roads, such as Highway 205 and Folly Farm Road, have a 300-foot setback. These roads are classified according to their surface and purpose; setbacks were determined consistent with BLM wilderness policy. The Steens Mountain Wilderness boundary begins 300 feet from centerline for both the Folly Farm and Highway 205 roads. On the portions of the Steens Mountain Back Country Byway that border the Steens Mountain Wilderness, the boundary begins 100 feet from centerline. All other roads bounded by Steens Mountain Wilderness have a 30-foot from centerline setback.

The roads and trails in the Steens Mountain Wilderness and Steens Mountain CMPA will follow the same priority outlined previously unless the Act states otherwise. Section 112(d) of the Act outlines the conditions for new road and trail construction. Such

construction for motorized or mechanized vehicles in the Steens Mountain CMPA is permissible only if the Secretary determines that it is necessary for public safety or environmental protection. There are no limits on construction of trails for nonmotorized or nonmechanized uses.

3 EXISTING MANAGEMENT SITUATION

3.1 Existing Management Direction

3.1.1 Introduction

This section describes the management direction found within the Andrews MFP and the following associated NEPA documents applicable to the Planning Area: Animal Damage Control Final Environmental Impact Statement, 3 Volumes (APHIS 1994); Steens Mountain CMPA IMP Draft (BLM 2001b); Decision Record and Finding of No Significant Impact for the Projects for Implementation of the Steens Mountain Cooperative Management and Protection Act of 2000, EA-OR-027-01-27 (BLM 2001c); Three Rivers RMP, Record of Decision, and Rangeland Program Summary (BLM 1992a); Donner und Blitzen National Wild and Scenic River Management Plan Environmental Assessment (BLM 1993b); National Wild and Scenic River Donner und Blitzen Management Plan Environmental Assessment (BLM 1992b); Noxious Weed Management Project Environmental Assessment EA No. OR-020-98-05 (BLM 1998a); Decision Record and Finding of No Significant Impact for Steens Mountain Trail Maintenance (BLM 2001d); Pueblo-Lone Mountain Management Plan EA (BLM 1995b); Andrews Grazing Management Program EIS (BLM 1982); Burns District Environmental Assessment for Commercial Day-Use Activities OR-020-EA-99-24 (BLM 1999a); the Land Tenure Adjustment Plan Amendment for the Andrews and Drewsey MFPs (BLM 1988b); and The Riddle Brothers Ranch Historic District Cultural Resources Management Plan, Environmental Assessment (BLM 1994b).

Several activity level plans have also been completed in recent years as follows: Steens Mountain Final Recreation Area Management Plan (BLM 1985); Andrews Rangeland Program Summary Update (BLM 1986); Pueblo-Lone Mountain Allotment Management Plan (BLM 1995c); Andrews Plan Amendment for Recreation Access Surrounding the Steens Mountain Loop Road (BLM 1993c); The Riddle Brothers Ranch Historic District Cultural Resources Management Plan (Crespin 1990); Kiger Mustang Area of Critical Environmental Concern Management Plan (BLM 1996a); Riddle Mountain and Kiger Wild Horse Herd Management Area Plan (BLM 1996b); SE Oregon Recreation Plan for Harney, Lake and Malheur Counties (Oregon Parks and Recreation Department 2000); Noxious Weed Policy and Classification System (Oregon Department of Agriculture 1997); Oregon's Bighorn Sheep Management Plan (ODFW 1992-1997); Oregon's Elk Management Plan (ODFW 1992); Mule Deer Plan (ODFW 1990); Oregon Cougar Management Plan Public Review Draft (ODFW 1993); Catlow Redband Trout and Catlow Tui Chub Conservation Agreement and Strategy (ODFW 1997); Oregon Outdoor Recreation Plan 1994-1999 (Oregon Parks and Recreation Department 1994); Oregon Wildlife Diversity Plan, 2nd edition (Puchy and Marshall 1993); Recovery Plan for the Pacific Bald Eagle (USFWS 1986); The Pacific Coast American Peregrine Falcon Recovery Plan (USFWS Pacific Coast American Peregrine Falcon Recovery Team 1982); and Recovery Plan for the Borax Lake Chub, *Gila boraxobius* (USFWS 1997).

Several BLM program documents or Inter-Agency plan/NEPA documents and decisions which also guide current management of lands within the Planning Area include the following: Visual Resource Management Program (BLM 1980);1613 - Areas of Critical Environmental Concern Resource Management Planning Guidance (BLM 1988a); Oregon Wilderness Final Environmental Impact Statement (BLM 1989a); Vegetation Treatment on BLM Lands in Thirteen Western States Final Environmental Impact Statement (BLM 1991a); Federal Land Policy and Management Act of 1976, as amended; Land Use Planning Handbook H-1601-1 Handbook (BLM Updated 2001e); National Management Strategy for Motorized Off-Highway Vehicle Use on Public Lands (BLM 2001f); Environmental Impact Statement, Volume III Appendices for all WSAs beginning with OR-2 plus OR-3-114 (BLM 1989b); National Environmental Policy Act Handbook H-1790-1 (BLM 1988c); Wilderness Management (BLM 2001g); Wilderness Management: Final Rule (BLM 2001h); Oregon Wilderness Environmental Impact Statement, Volume I-Statewide (BLM 1989c); Upper Columbia River Basin Draft Environmental Impact Statement, Volume 1 (BLM 1997b); Proposed Southeast Oregon Resource Management Plan and Final Environmental Impact Statement, Volume 1 of 3 - Text (BLM 2000a); Rangeland Reform '94, Draft Environmental Impact Statement Executive Summary (BLM 1994c); Interior Columbia Basin Final Environmental Impact Statement (BLM 2000b); House Report 101-405 (Arizona Desert Wilderness Act of 1990); House Report 101-405 Appendix A, Grazing Guidelines (1990) ; Oregon Natural Heritage Plan (Oregon Natural Heritage Advisory Council 1998a); Reformatted Comprehensive Plan for the City of Burns, Oregon (1997); The National Environmental Policy Act of 1969, as amended; Oregon Wilderness Final Environmental Impact Statement (BLM 1989a); H-8550-1: IMP for lands under Wilderness Review (BLM 1995c); Wildland and Prescribed Fire Management Policy

(National Park Service et al. 1998); Endangered and Threatened Wildlife and Plants: Animal Candidate Review for Listing as Endangered or Threatened Species, Proposed Rules (USFWS 1991); and Greater Sage-Grouse and Sagebrush-Steppe Ecosystems Management Guidelines (BLM et al. 2000j).

The specific management direction from the Andrews MFP, the IMP, and the Act are summarized in the following section.

3.2 Existing Management Situation by Resource

3.2.1 Air Quality

3.2.1.1 Andrews Management Framework Plan

- Limit prescribed burning in rangelands to 6,000 acres per year.

3.2.2 Vegetation

3.2.2.1 Andrews Management Framework Plan

Objective 1: Restore, protect, and enhance the diversity and distribution of desirable vegetation communities, including perennial native and desirable introduced plant species. Provide for their continued existence and normal function in nutrient, water, and energy cycles.

- Improve ecological condition and increase forage production through the development and implementation of economically feasible grazing systems and range improvements.
- Maintain vegetative composition of nonnative seedings to ensure continued forage production for the purpose established.
- Implement vegetation manipulation projects consistent with existing management objectives in the resource area. Rehabilitate or revegetate areas burned by wildfire to protect soil, water, and vegetation resources or to prevent unacceptable on- or off-site damages. Rehabilitate areas burned by prescribed fire to meet objectives of the burn.
- Following fire, close rehabilitated areas to grazing for at least two growing seasons. Exceptions may be justified on a case-by-case basis.
- Maintain or improve deer/antelope winter range.
- Establish appropriate firebreaks to protect at-risk annual rangeland using nonnative perennial and native species. Use economical seed mixes and methods available for establishment of effective fire breaks.

Objective 2: Manage big sagebrush cover in seedings and on native rangeland to meet the life history requirements of sagebrush-dependent wildlife.

- Specific areas identified for the protection of mule deer and sage-grouse habitat would continue to be protected. Certain areas would be identified where brush control would benefit pronghorn.

Objective 3: Control the introduction and proliferation of noxious weed species and reduce the extent and density of established weed species to within acceptable limits.

- Apply approved noxious weed control methods in an integrated weed management program (including preventive management, as well as mechanical, biological, and chemical control techniques). Do so in cooperation with the State of Oregon, other adjacent states, federal agencies, affected counties, adjoining private landowners, and other interests directly affected.

3.2.2.2 Interim Management Policy

- Special status plant species will continue to be monitored and their habitat managed to avoid listing as threatened or endangered.
- Research Natural Areas, unique plant communities, and all other native vegetation will be maintained.
- The sale of commercial timber will not be permitted. Prescribed fire and juniper control projects planned prior to legislation which have completed NEPA documentation and are in conformance with the Act, may still be implemented within the Steens Mountain CMPA.
- Other new prescribed fire and juniper control projects will be evaluated through the NEPA process and coordinated through the SMAC to ensure they meet the requirements and purpose of the Steens Mountain CMPA.

3.2.3 Special Status Plants

3.2.3.1 Andrews Management Framework Plan

Objective: Manage public land to maintain, restore, or enhance populations and habitats of special status plant species. Priority for the application of management actions would be (1) federal endangered species, (2) federal threatened species, (3) federal proposed species, (4) federal candidate species, (5) state listed species, (6) BLM sensitive species, (7) BLM assessment species, and (8) BLM tracking species. Manage in order to conserve or lead to the recovery of threatened or endangered species.

- Ensure that management actions do not contribute to the decline of special status species.
- Emphasize management that is driven by the requirements of individual species.

3.2.4 Watershed/Water Resources and Riparian/Wetlands

3.2.4.1 Andrews Management Framework Plan

Objective 1: Ensure that surface water and ground water influenced by BLM activities comply with or are making progress toward achieving State of Oregon water quality standards for beneficial uses as established per stream by the ODEQ.

- Maintain or improve water quality where needed, as previously identified in land use plans. Continue to manage for water quality improvement. Coordinate with and implement Oregon's water quality management plan for activities within water quality limited segments (impaired waters) as defined by Section 303(d) of the Clean Water Act.

Objective 2: Restore, maintain, or improve riparian vegetation, habitat diversity, and associated watershed function to achieve healthy and productive riparian areas and wetlands.

- Manage for current riparian/wetland objectives as outlined in land use plans. Maintain or improve all existing riparian wetland exclosures and pastures designated or identified for improvement. For any riparian or wetland area, uses or activities could occur in the watershed if they allow progress toward the attainment of riparian PFC.

3.2.5 Grazing Management

3.2.5.1 Andrews Management Framework Plan

Objective: Provide for a sustained level of livestock grazing consistent with other resource objectives and public land use allocations.

- Continue the authorization of livestock grazing use consistent with multiple-use and sustained yield objectives identified in existing land use and activity plans.
- Combine rangeland projects and administrative solutions to meet resource management objectives. Plan and implement rangeland projects to minimize unacceptable livestock grazing impacts to public land resources and to access available but under-utilized forage. Abandon and rehabilitate projects that do not function to meet MFP and RPS management objectives.
- Authorize Temporary Non-renewable grazing use of additional forage production consistent with existing MFP and RPS management objectives.

Forage Allocations

Under the existing plan, forage allocations are adjusted to accommodate other resource values. Forage is allocated for wild horses and wildlife. In other major riparian areas and special management areas, grazing is managed to improve or maintain the condition of the area.

The existing plan adjusts active grazing use to conform with existing grazing capacity in the following allotments: Pueblo-Lone Mountain and Trout Creek Mountain. No adjustments are required on other allotments because current authorized (permitted) use is within grazing capacity. Trespass control programs continue to help prevent unauthorized livestock use and keep stocking rates at carrying capacity.

Under the existing plan, preference is shifted across allotment boundaries where excess forage exists. Some livestock use in Trout Creek Mountain has been shifted to Tule Springs Allotment and new boundaries have been established. In addition, active use could also be transferred to Diamond Seedings in the Three Rivers RA on a temporary or permanent basis, if forage becomes available in the future.

Under the existing plan, forage production has been increased to meet existing and projected demand for livestock forage.

Management

Under the existing plan, acres in 32 allotments are managed under category "I", improve; seven allotments are managed under "M", maintain, and 33 allotments are managed under category "C", custodial. Under custodial management, BLM activities are limited to issuing grazing permits and periodic monitoring of range condition and trend. No significant expenditure of public range improvement funds is invested on rangelands under custodial management; however, the range user may invest private funds to improve management and condition of these ranges.

Range Improvements

Range improvements include the following: fences, wells, pipelines, spring developments, waterholes, cattleguards, seedings, and brush control. The range improvements in the existing plan are cost-effective, according to a preliminary benefit-cost analysis on an allotment basis. An allotment-specific benefit-cost analysis was conducted in time for summary in the final grazing EIS and each project was analyzed as to its economic feasibility prior to development. Some of the proposed range improvements arrayed in the summary and the draft Andrews grazing EIS were dropped from consideration after completion of benefit cost analysis.

The existing plan level of range improvements is within potential funding levels for the planning period of ten years. Funding sources may include federal, state, county and private contributed funds. After completion of the decision process, the actual level of range improvements will be limited by the availability of funds. Maintenance of most new range improvements as well as existing improvements is the responsibility of the benefitting range users.

Fences - Fences are constructed that are cost-effective and necessary to meet specific rangeland objectives. Fencing is necessary to establish pastures and grazing systems for intensive management. Fencing is also used to exclude livestock from some special management areas and riparian zones.

Water Developments and Pipelines - The existing plan allows construction of all cost-effective water developments and pipelines required to meet range management objectives. Proposed projects in WSAs are analyzed on a site specific basis. Those projects which enhance wilderness values, are not impairing, and do not require mechanized vehicle use for continual maintenance, are consistent with interim management for WSAs. Projects are established only if they meet these criteria.

Brush Management - Under the existing plan, brush is controlled by brush beating or fire on 54,820 acres. Brush control and seeding using both native and introduced species is used on 61,630 acres. Land treatments are permitted on crucial wildlife habitat only when they enhance the area for wildlife. Crucial wildlife habitat includes riparian areas, deer fawning, summer, and winter range, bighorn sheep range, 90 percent of the area within two miles of sage-grouse strutting grounds, and 0.5 miles within raptor nesting areas. No drilled seedings are proposed in recommended WSAs and special management areas. Drilled seedings will not be implemented in any WSA unless Congress decides not to designate the areas as wilderness.

3.2.5.2 Interim Management Policy

- Livestock grazing will continue in the Steens Mountain CMPA where allowed under the Act, and in conformance with applicable laws, policy, and BLM regulations including the Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands in Oregon and Washington (August 1997a).
- Grazing management will be guided by the Andrews MFP (1982), the Andrews Range Program Summary 1984, the Three Rivers RMP (1992) and other changes created by the Act.

- The BLM will retire grazing permits, in whole or part, applicable to certain lands within the Steens Mountain Wilderness in accordance with section 113(d)(2) of the Act after implementing fencing and alternative forage resources in accordance with sections 113(d)(3) and 113(d)(4) of the Act.
- Adjustments in allotment boundaries, ten year permits, and grazing preference associated with the above referenced sections of the Act will only be implemented to reflect the changes created by the Act.

Livestock, Watershed and Wildlife Facilities

- Range improvements planned prior to legislation which have completed NEPA documentation and are in conformance with the Act may still be implemented within the Steens Mountain CMPA.
- New range improvements needed to fully implement the No Livestock Grazing Area and other legislated grazing changes may be constructed following NEPA analysis.
- Other new range improvements will be coordinated through the SMAC to obtain its perspectives and advice in satisfying the requirements and purpose of the Steens Mountain CMPA.
- Maintenance and reconstruction of existing support facilities in the Steens Mountain Wilderness and WSAs will be in accordance with existing guidance for wilderness, WSAs, NEPA, and the Act.
- Maintenance, reconstruction, and construction of new support facilities in wilderness areas where grazing is allowed, as well as access for these and other purposes, will be in compliance with the Wilderness Act and House Report 101-405 (Arizona Desert Wilderness Act) grazing guidelines.
- In WSAs, maintenance, reconstruction, new construction and access to livestock facilities will be in compliance with the IMP For Lands Under Wilderness Review (BLM Manual H-8550-1).

3.2.5.3 Steens Mountain Cooperative Management and Protection Act

SEC. 113. LAND USE AUTHORITIES

(e) Grazing.-

(2) Cancellation of certain permits.-The Secretary shall cancel that portion of the permitted grazing on Federal lands in the Fish Creek/Big Indian, East Ridge, and South Steens allotments located within the area designated as the "no livestock grazing area" on the map referred to in section 101(a). Upon cancellation, future grazing use in that designated area is prohibited. The Secretary shall be responsible for installing and maintaining any fencing required for resource protection within the designated no livestock grazing area.

(3) FORAGE REPLACEMENT. – Reallocation of available forage shall be made as follows:

(A) O'Keefe pasture within the Miners Field allotment to Stafford Ranches.

(B) Fields Seeding and Bone Creek Pasture east of the county road within the Miners Field allotment to Amy Ready.

(C) Miners Field Pasture, Schouver Seeding and Bone Creek Pasture west of the county road within the Miners Field allotment to Roaring Springs Ranch.

(D) 800 animal unit months within the Crows Nest allotment to Lowther (Clemens) Ranch.

(4) FENCING AND WATER SYSTEMS. – The Secretary shall also construct fencing and develop water systems as necessary to allow reasonable and efficient livestock use of the forage resources referred to in paragraph (3).

3.2.6 Fisheries

3.2.6.1 Andrews Management Framework Plan

Objective: Restore, maintain, or improve habitat to provide for diverse and self-sustaining communities of fishes and other aquatic organisms.

The existing plan follows current objectives for fish and aquatic habitat, as outlined in current land use plans. All existing riparian/wetland exclosures and pastures will be maintained or improved.

3.2.7 Wildlife

3.2.7.1 Andrews Management Framework Plan

Objective 1: Maintain, restore, or enhance riparian areas and wetlands so they provide diverse and healthy conditions for wildlife.

- Manage for desired future habitat conditions that emphasize structure, forage, or other riparian habitat elements important to game and non-game species of wildlife.

Objective 2: Manage upland habitats in forest, woodland and rangeland vegetation types so that the forage, water, cover, structure and security necessary for wildlife are available on the public land.

- Manage habitat conditions which emphasize the requirements of game species with some limited local emphasis on the habitat requirements of nongame species.
- Emphasize habitat management that highlights the requirements of individual species.

Big Game - Under the existing plan, 3,399 AUMs of competitive forage are allocated to deer and antelope.

Bighorn Sheep - Bighorn sheep have been introduced in the Steens Mountain, Pueblo Mountains, Lone Mountain, and Catlow Rim. Buckskin Mountain-Tule Spring-Sand Gap areas, and Mickey Hot Spring to Table Mountain are considered suitable for introduction of bighorn sheep. Some bighorn sheep have migrated into other areas. Introductions and reintroductions are coordinated with the ODFW.

Brush Management - Brushland conversion is allowed on crucial wildlife habitats only when the primary benefits are for wildlife. Crucial wildlife habitat includes deer winter, summer and fawning range, bighorn sheep range, riparian areas, and within 0.5 miles of raptor nesting areas. Only ten percent of the area within two miles of sage-grouse strutting grounds would be converted unless brush conversion would be beneficial to sage-grouse.

Brush is allowed to reinvade a portion of burned or mechanically treated land to reestablish forage and cover for deer and other wildlife. Portions of Frazier Field, Mud Creek and Krumbo allotments would provide deer winter range.

Specific areas identified for protection of mule deer and sage-grouse habitat continue to be protected. Certain areas have been identified where brush control would benefit pronghorn.

Construction Projects - An environmental assessment is required before new roads are built or existing roads upgraded. Human activities, such as equipment operation and blasting, are restricted in raptor areas, sage-grouse strutting grounds, and antelope kidding grounds during critical seasons.

Wetlands, including Mann Lake, Pueblo Slough, Juniper Lake, Rock Creek Reservoir and public land near Borax Lake are managed to favor wildlife production and uses. Other wetland areas are created, maintained, or improved wherever economically feasible. The BLM has fenced off the public portion of the shoreline of Mann Lake in order to restrict cattle, which can access the lake from private land.

Other significant wet meadows are maintained or improved for soil stability and water quality through proper grazing management. If monitoring indicates that meadows are not improving, other management techniques are employed.

3.2.7.2 Interim Management Policy

- Agreements with the APHIS concerning animal damage control will be modified to reflect changed land designations (e.g., wilderness) in identified work areas, methods of control, and transportation into those areas. Existing agreements with state and federal wildlife agencies will be modified to conform with the applicable changes created by legislation.
- Hunting, fishing, and trapping will continue within the Steens Mountain CMPA consistent with the Act, other applicable laws and regulations of the United States and the State of Oregon, and will be managed under regulations provided by the ODFW and in accordance with section 113(d) of the Act.

3.2.7.3 Steens Mountain Cooperative Management and Protection Act

(d) HUNTING, FISHING, AND TRAPPING. –

(1) AUTHORIZATION. – The Secretary shall permit hunting, fishing, and trapping on federal lands included in the Steens Mountain CMPA in accordance with applicable laws and regulations of the United States and the State of Oregon.

(2) AREA AND TIME LIMITATIONS. – After consultation

with the ODFW, the Secretary may designate zones and periods prohibiting hunting, trapping or fishing on federal lands included in the Steens Mountain CMPA for reasons of public safety, administration, or public use and enjoyment.

3.2.8 Wild Horses

3.2.8.1 Andrews Management Framework Plan

Objective: Maintain and manage wild horse herds in established HMAs at AMLs to ensure a thriving, natural ecological balance between wild horse populations, wildlife, livestock, vegetation resources, and other resource values. Enhance and perpetuate special and unique characteristics that distinguish the respective herds.

- Maintain established boundaries of South Steens, Alvord-Tule Springs, Heath Creek-Sheepshead, Kiger, and Riddle Mountain HMAs.
- Manage wild horse populations in current HMAs within the limits of established AMLs.
- Limit any return of wild horses into an HMA to individuals exhibiting the special and unique characteristics designated for that HMA.
- Maintain established water developments supporting AMLs. Emphasize the construction of water developments to minimize forage competition between wild horses, wildlife, and livestock.

Five HMAs are in the Planning Area: South Steens, Heath Creek/Sheepshead, Alvord/Tule Springs, Kiger, and Riddle Mountain. The Heath Creek-Sheepshead HMA encompasses 62,427 acres. The Alvord-Tule Springs HMA contains 343,201 acres. In the Alvord-Tule Springs HMA, the district boundary between Burns and Vale is fenced, splitting the Burns and Vale horse herds into two separate management units. The South Steens HMA contains 127,838 acres. The Kiger HMA contains 6,531 acres, and the Riddle HMA contains 25,328 acres within the Planning Area.

Herd numbers are kept at levels consistent with existing herd management plans. Maintaining these herd numbers requires roundups every three to five years. In the past, when the populations have been controlled at these levels, adequate habitat has been available for horses and other uses.

The 50 to100 horses in the Heath Creek-Sheepshead herd use the Burns side of the HMA seasonally for four months in the winter. Forage allocation for wild horses is consistent with existing use.

Domestic horse grazing is not allowed in any HMAs.

Under the existing plan, superior wild stock will be transferred between herds to improve herd quality over time. No domesticated stock will be utilized for this purpose.

3.2.9 Fire Support

3.2.9.1 Andrews Management Framework Plan

Objective 1: Provide an Appropriate Management Response (AMR) on all wildland fires, with emphasis on minimizing suppression costs, considering fire fighter and public safety, benefits, and values to be protected, consistent with resource objectives.

- Provide an AMR of initial attack, full suppression on all wildland fires, ensuring that fire and resource standards and objectives, as identified in the current FMAP, are met.

Objective 2: Recognize fire as a critical natural process and use it to protect, maintain, and enhance resources.

- Use prescribed fire as needed to meet resource objectives.

Under the existing plan, both fire suppression and the use of prescribed fire are emphasized in the fire program.

Prescribed fire plays an important role in rangeland improvement. Planned ignition prescribed burns are used in many of the brush control and seeding projects discussed in the Range and Wildlife sections. With the development of a fire management plan, more extensive use of unplanned ignition burns with limited suppression will be made. Unplanned burns are valuable in accomplishing the objectives of the land use plan.

3.2.9.2 Interim Management Policy

- On all lands other than WSAs or designated Steens Mountain Wilderness within the Steens Mountain CMPA, current fire management practices will continue, subject to provisions in the Act.
  Steens Mountain Wilderness

- Fire suppression within the Steens Mountain Wilderness will take place in accordance with the provisions of the Wilderness Act, Management of Designated Wilderness Manual 8560, and the Act. Pursuant to 8560 § .35A, all wildland fires will be suppressed until an approved Fire Management Plan is prepared.
- Suppression actions in the Steens Mountain Wilderness will be executed to minimize surface disturbance, alterations of the natural landscape, and fire suppression costs while being consistent with management objectives and constraints.
- Methods and equipment which least alter the landscape or disturb the land surface will be used.
- Suppression structures and improvements will be located outside the Steens Mountain Wilderness, except those that are the minimum necessary to protect life, property, public welfare, and Steens Mountain Wilderness objectives.
- Suppression preplanning will be conducted with review by an interdisciplinary team to determine appropriate response and equipment to be used for fire suppression.
- Protection of the Steens Mountain Wilderness resource will be made part of the suppression objectives for all fires. Tactics will utilize the minimum tool concept to achieve these objectives.
- Non-mechanized equipment will be used unless alternatives are approved by the District Manager.
- Suppression work will be done with minimal ground disturbance and vegetation cutting while safely meeting objectives.
- Mop-up methods that minimize disturbance will be preferred.

Wilderness Study Areas

- Fire management within the WSAs will continue in accordance with the provisions of the IMP For Lands Under Wilderness Review (*H-8550-1*).
- All wildland fires will be suppressed until an approved Fire Management Plan is prepared.

Emergency Fire Rehabilitation

- On all lands other than WSAs or designated Steens Mountain Wilderness within the Steens Mountain CMPA, the BLM's Emergency Fire Rehabilitation policy will be in effect.
- The BLM emergency fire rehabilitation manual allows watershed restoration in designated Steens Mountain Wilderness where human-caused soil and hydrologic degradation threatens Steens Mountain Wilderness values. Restoration may also occur, even if not human-caused, where conditions present a definite hazard to life or property, or where such conditions could harm environmental quality outside the Steens Mountain Wilderness. Where such dangers are not imminent or where natural vegetation is expected to recover in a reasonable time, restoration work will not occur.
- When natural recovery is unlikely, watershed restoration will be done using native or naturalized species. Motorized equipment will not be used when more primitive equipment can accomplish restoration objectives. Exceptions must be fully justified by serious threat to downstream values. Approval by the State Director is required for all watershed restoration proposals.
- In WSAs, the BLM emergency fire rehabilitation manual provides for watershed rehabilitation after damage from fire, flood, storms, biological phenomena, or landslides. Restoration may involve any treatments needed, but must be done in a manner that will sustain wilderness suitability. Rehabilitation work will use methods least damaging to wilderness characteristics. Alternatives to seeding will be carefully evaluated prior to any reclamation decision. Emergency reseeding and planting will utilize native species and will minimize use of motorized equipment. Seedings and plantings will avoid a plantation appearance.
- Watershed rehabilitation requirements, including structures, will be permitted only if they satisfy non-impairment criteria. Land treatments (e.g., trenching, ripping, pitting, terracing, plowing) will not be permitted on wilderness review lands.

3.2.10 Woodlands

3.2.10.1 Andrews Management Framework Plan

Objective: Restore productivity and biodiversity in juniper and quaking aspen woodland areas. Manage juniper areas where encroachment or increased density is threatening other resource values. Retain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain diversity of age classes and to allow for species reestablishment.

- Base juniper management on site potential to meet resource objectives. Approximately 80,000 acres of juniper would be treated.
- Preserve old growth juniper stands.
- Continue to manage quaking aspen to meet resource objectives.

3.2.10.2 Steens Mountain Cooperative Management and Protection Act
(b) COMMERCIAL TIMBER. –

(1) PROHIBITION. – The Federal lands included in the CMPA shall not be made available for commercial timber harvest.

(2) LIMITED EXCEPTION. – The Secretary may authorize the removal of trees from Federal lands in the CMPA only if removal is needed for ecological restoration and maintenance or for public safety. Except in the Wilderness Area and the Wilderness study areas referred to in section 204(a), the Secretary may authorize the sale of products resulting from such authorized removal.

3.2.11 Special Status Animal Species

3.2.11.1 Andrews Management Framework Plan

Objective 1: Manage public land to maintain, restore, or enhance populations and habitats of special status animal species. Priority for the application of management actions would be (1) federal endangered species, (2) federal threatened species, (3) federal proposed species, (4) federal candidate species, (5) state listed species, (6) BLM sensitive species, (7) BLM assessment species, and (8) BLM tracking species. Manage in order to conserve or lead to the recovery of threatened or endangered species.

- Manage habitat for special status animal species to preserve the species and to prevent the need to list them as threatened or endangered under the ESA.
- Manage special status species using a mix of maintenance, restoration, or enhancement measures with equal emphasis on game and nongame species.
- Emphasize management that is driven by the requirements of individual species.
- Manage public land in accordance with the Catlow Redband Trout and Catlow Tui Chub Conservation Agreement and Strategy. Continue coordination with the private landowner and Malheur National Wildlife Refuge for domestic livestock grazing strategy that allows recovery of the habitat. Manage the Blitzen Pasture as described in Donner und Blitzen NWSR Plan Revision. Continue adaptive domestic livestock grazing management, wild horse management, and prescribed burns as described in the South Steens AMP. Approximately 30 miles of private land/public land boundary fencing is expected.

Objective 2: Facilitate the maintenance, restoration, and enhancement of bighorn sheep populations and habitat on public land. Pursue management in accordance with Oregon's Bighorn Sheep Management Plan in a manner consistent with the principles of multiple-use management.

- Bighorn sheep would be managed as identified in an existing Habitat Management Plan (HMP).
- Require that reasonable buffers (based on local conditions) be maintained on public land between domestic sheep and bighorn to avoid disease transmission.
- Bighorn management would not result in the displacement of any existing domestic sheep grazing permittees.
- Bighorn would be allowed to pioneer outside of area and increase as long as conflicts are minor.

3.2.12 Areas of Critical Environmental Concern

3.2.12.1 Andrews Management Framework Plan

Objective: Retain existing and designate new ACEC/RNAs where relevance and importance criteria are met and special management is required to protect the values identified.

- The existing plan includes the retention of 14 existing ACECSs (nine of which are RNAs) for a total of 100,048 acres.
- The ACEC/RNAs are managed with the special management actions.

Alvord Desert ACEC - 17,933 acres managed to protect desert land forms and unique plant communities.

Alvord Peak ACEC - 15,015 acres managed to protect bighorn sheep habitat.

Borax Lake ACEC - 520 acres managed to protect diverse plant and animal life in the vicinity of Borax Lake, where the federally endangered Borax Lake chub is located.

East Kiger Plateau ACEC/RNA - 1,216 acres managed to protect excellent condition, high elevation fescue grassland and special status plants (partially included in Steens Mountain ACEC).

Little Blitzen ACEC/RNA - 2,530 acres managed to protect mid- to high-elevation vernal pond, stream system in subalpine, quaking aspen grove, snow deflation, and snow cover communities, late-lying snowbeds, fescue grassland, and special status plants (entirely within Steens Mountain ACEC).

Little Wildhorse Lake ACEC/RNA - 241 acres managed to protect pristine, mid- to high-elevation lake (entirely within Steens Mountain ACEC).

Long Draw ACEC/RNA - 441 acres managed to protect vegetation community type of big sagebrush/Indian ricegrass/needle-and-thread grass.

Mickey Basin ACEC/RNA - 560 acres managed to protect winterfat plant community.

Picket Rim ACEC - 3,941 acres managed to protect nesting area and habitat for many kinds of birds of prey.

Pueblo Foothills ACEC/RNA - 2,503 acres managed to protect narrowleaf cottonwood/Mormon tea community complex and special status plants.

Rooster Comb ACEC/RNA - 716 acres managed to protect mountain mahogany/blue bunch wheatgrass plant communities and black cottonwood riparian plant communities (entirely within Steens Mountain ACEC).

South Fork Willow Creek ACEC/RNA - 231 acres managed to protect downslope snow accumulation areas; upper cirque plant communities; stream system originating in a glacial cirque; and special status plants (entirely within Steens Mountain ACEC).

Steens Mountain ACEC - 56,187 acres managed to protect high scenic values on Steens Mountain, including Steens escarpment, vista of East Rim, and glacial cirques and valleys (this area is now designated Steens Mountain Wilderness).

Tumtum Lake ACEC/RNA - 2,064 acres managed to protect low-elevation alkaline lake; salt desert shrub plant communities; special status plants; and special status fish and habitat.

3.2.13 Redband Trout Reserve

3.2.13.1 Interim Management Policy

- In cooperation with the ODFW, the Donner und Blitzen River above the confluence with Fish Creek will be managed as a redband trout reserve for the purposes stated in section 302(c) of the Act.
- Scientific research, environmental education, and angling will continue under ODFW regulations and be consistent with the Management of Designated Wilderness Areas Manual 8560.

3.2.13.2 Steens Mountain Cooperative Management and Protection Act

SEC. 302. DONNER UND BLITZEN RIVER REDBAND TROUT RESERVE.

(a) FINDINGS. – The Congress finds the following:

(1) Those portions of the Donner und Blitzen River in the Wilderness Area are an exceptional environmental resource that provides habitat for unique populations of native fish, migratory waterfowl, and other wildlife resources, including a unique population of redband trout.

(2) Redband trout represent a unique natural history reflecting the Pleistocene connection between the lake basins of eastern Oregon and the Snake and Columbia Rivers.

(b) DESIGNATION OF RESERVE. – The Secretary shall designate the Donner und Blitzen Redband Trout Reserve consisting of the Donner und Blitzen River in the Wilderness Area above its confluence with Fish Creek and the federal riparian lands immediately adjacent to the river.

(c) RESERVE PURPOSES. – The purposes of the Redband Trout Reserve are –

(1) to conserve, protect, and enhance the Donner und Blitzen River population of redband trout and the unique ecosystem of plants, fish, and wildlife of a river system; and

(2) to provide opportunities for scientific research, environmental education, and fish and wildlife oriented recreation and access to the extent compatible with paragraph (1).

(d) EXCLUSION OF PRIVATE LANDS. – The Redband Trout Reserve does not include any private lands adjacent to the Donner und Blitzen River or its tributaries.

(e) ADMINISTRATION. –

(1) IN GENERAL. – The Secretary shall administer all lands, waters, and interests therein in the Redband Trout Reserve consistent with the Wilderness Act (16 U.S.C. 1131 et seq.) And the Wild and Scenic Rivers Act (16 U.S.C. 1271 et seq.).

(2) CONSULTATION. – In administering the Redband Trout Reserve, the Secretary shall consult with the advisory council and cooperate with the Oregon Department of Fish and Wildlife.

(3) RELATION TO RECREATION. – To the extent consistent with applicable law, the Secretary shall manage recreational activities in the Redband Trout Reserve in a manner that conserves the unique population of redband trout native to the Donner und Blitzen River.

(4) REMOVAL OF DAM. – The Secretary shall remove the dam located below the mouth of Fish Creek and above Page Springs if removal of the dam is scientifically justified and funds are available for such purpose.

(f) OUTREACH AND EDUCATION. – The Secretary may work with, provide technical assistance to, provide community outreach and education programs for or with, or enter into cooperative agreements with private landowners, state and local governments or agencies, and conservation organizations to further the purposes of the Redband Trout Reserve.

3.2.14 Wild and Scenic Rivers

3.2.14.1 Andrews Management Framework Plan

Objective: Protect and enhance ORVs of designated WSRs, and protect and enhance ORVs of rivers found suitable for potential inclusion in WSRs until Congress acts.

- Amend the Donner und Blitzen NWSR Management Plan (1993b) in accordance with the U.S. District Court, Oregon, Final Judgment of May 1, 1997. Maintain the existing wild classification throughout the river corridor.
- Manage eligible rivers under interim management guidance.

3.2.14.2 Interim Management Policy

- Maps and "legal descriptions" (corridors) will be developed for the new Wild and Scenic River segments and provided to the SMAC for its perspective and advice.
- ORV inventories will be conducted for Ankle and Mud Creeks after completion of the designated land exchange(s).
- The Donner und Blitzen Wild and Scenic River and the newly designated WSRs will be managed in accordance with the Act, the Wild and Scenic Rivers Act, and the Wilderness Act.
- The Donner und Blitzen National Wild and Scenic River Management Plan will continue to guide management of the Donner und Blitzen Wild and Scenic River to the extent the management plan is consistent with the Act.

3.2.14.3 Steens Mountain Cooperative Management and Protection Act

TITLE III - WILD AND SCENIC RIVERS AND TROUT RESERVE

SEC. 301. DESIGNATION OF STREAMS FOR WILD AND SCENIC RIVER STATUS IN STEENS MOUNTAIN AREA.

(a) EXPANSION OF DONNER UND BLITZEN WILD RIVER. – Section 3(a)(72) of the Wild and Scenic Rivers Act (16 U.S.C. 1274(a)(84)) is amended –

(1) by striking "the" at the beginning of each subparagraph and inserting "The";

(2) by striking the semicolon at the end of subparagraphs (A), (B), (C), and (D) and inserting a period;

(3) by striking "; and" at the end of subparagraph (E) and inserting a period; and

(4) by adding at the end of the following new subparagraphs:

"(G) The 5.1 mile segment of Mud Creek from its confluence with an unnamed spring in the SW 1/4 SE 1/4 of section 32, township 33 south, range 33 east, to its confluence with the Donner und Blitzen River.

"(H) The 8.1 mile segment of Ankle Creek from its headwaters to its confluence with the Donner und Blitzen River.

"(I) The 1.6 mile segment of the South Fork of Ankle Creek from its confluence with an unnamed tributary in the SE 1/4 SE 1/4 of section17, township 34 south, range 33 east, to its confluence with Ankle Creek.".

(b) DESIGNATION OF WILDHORSE AND KIGER CREEKS, OREGON. – Section 3(a) of the Wild and Scenic Rivers Act (16 U.S.C. 1274(a)) is amended by adding at the end the following new paragraph:

"(1) WILDHORSE AND KIGER CREEKS, OREGON. – The following segments in the Steens Mountain Cooperative Management and Protection Area in the State of Oregon, to be administered by the Secretary of the Interior as wild rivers:

"(A) The 2.6-mile segment of Little Wildhorse Creek from its headwaters to its confluence with Wildhorse Creek.

"(B) The 7.0-mile segment of Wildhorse Creek from its headwaters, and including .36 stream miles into section 34, township 34 south, range 33 east.

"(C) The approximately 4.25-mile segment of Kiger Creek from its headwaters to the point at which it leaves the Steens Mountain Wilderness Area within the Steens Mountain Cooperative Management and Protection Area.".

(c) MANAGEMENT. – Where management requirements for a stream segment described in the amendments made by this section differ between the Wild and Scenic Rivers Act (16 U.S.C. 1271 et seq.) and the Wilderness Area, the more restrictive requirements shall apply.

3.2.15 Wildlands Juniper Management Area

3.2.15.1 Interim Management Policy

The WJMA will be managed consistent with section 501 of the Act. Prior to the development of juniper management strategies, the area will be inventoried for plants and resident or seasonal animals. Some interpretive signs may be placed in strategic locations. Any juniper management actions that take place in the WJMA will be evaluated through the NEPA process and coordinated with the SMAC to ensure they meet the requirements and purpose of the Act.

3.2.15.2 Steens Mountain Cooperative Management and Protection Act

SEC. 501. WILDLANDS JUNIPER MANAGEMENT AREA.

(a) ESTABLISHMENT. – To further the purposes of section 113(c), the Secretary shall establish a special management area consisting of certain federal lands in the Cooperative Management and Protection Area, as depicted on the map referred to in section 101(a), which shall be known as the Wildlands Juniper Management Area.

(b) MANAGEMENT. – Special management practices shall be adopted for the Wildlands Juniper Management Area for the purposes of

experimentation, education, interpretation, and demonstration of active and passive management intended to restore the historic fire regime and native vegetation communities on Steens Mountain.

(C) AUTHORIZATION OF APPROPRIATIONS. – In addition to the authorization of appropriations in section 701, there is authorized to be appropriated $5,000,000 to carry out this title and section 113(c) regarding juniper management in the Cooperative Management and Protection Area.

SEC. 502. RELEASE FROM WILDERNESS STUDY AREA STATUS.

The Federal lands included in the Wildlands Juniper Management Area established under section 501 are no longer subject to the requirement of section 603(c) of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1782(c)) pertaining to managing the lands so as not to impair the suitability of the lands for preservation as wilderness.

3.2.16 Wilderness/Wilderness Study Areas

3.2.16.1 Andrews Management Framework Plan

The Andrews MFP discussed wilderness and WSAs but did not make any decisions. The decisions were made by the Oregon Wilderness EIS (BLM 1989a), the Wilderness Study Report (BLM 1991b), and the Act. No decision was made regarding Wilderness or WSAs in the Andrews MFP.

Public land was inventoried in the early 1980s to see if it contained wilderness characteristics. Those areas found to have wilderness character were identified as WSAs and all other land was eliminated from further consideration in the wilderness review. Some of the criteria used in the wilderness inventory were naturalness, solitude, primitive and unconfined recreational opportunities, special features, and manageability.

In October of 2000, Congress passed the Act, which designated the Steens Mountain Wilderness in the Steens Mountain CMPA and expanded the Basque Hills WSA with a 3,840-acre addition in the Andrews MU. In addition, the Act altered some of the WSAs in the Steens Mountain CMPA and created a No Livestock Grazing Area within the Steens Mountain Wilderness. Until Congress acts on the wilderness recommendations or otherwise releases the existing WSAs for other purposes, they will continue to be managed in accordance with the BLM's IMP for Lands Under Wilderness Review, FLPMA, and other applicable laws and policies. The WSAs are also managed according to the Andrews MFP and the Wilderness Act, which detail restrictions on use and access. The following 16 WSAs in the Andrews MU range from approximately 8,500 acres to 236,000 acres.

Wilderness Study	Acres
Alvord Desert	97,670
Basque Hills	72,082
Disaster Peak	3,672
East Alvord	22,161
Hawk Mountain	24,226
Heath Lake	21,197
Mahogany Ridge	27,053
Pueblo Mountains	73,547
Red Mountain	15,659
Rincon	104,979
Sheepshead Mountains	21,679
Table Mountain	39,886
West Peak	8,598
Wildcat Canyon	8,543
Willow Creek	2,424
Winter Range	15,517

Management of existing WSAs in the Steens Mountain CMPA will continue as directed under the BLM IMP for Lands Under Wilderness Review, the Act, the FLPMA, and the IMP for the Steens Mountain CMPA. Seven WSAs in the Steens Mountain CMPA include the following:

Wilderness Study	Acres
Blitzen River	31,737
Bridge Creek	14,284
High Steens	13,227
Home Creek	1,165
Lower Stonehouse	7,449
South Fork Donner und	27,969
Stonehouse	22,765

3.2.16.2 Interim Management Policy

- The non-impairment standard under FLPMA will continue to apply to WSAs, and management will continue as directed under the IMP for Lands Under Wilderness Review (BLM H-8550-1).
- A 3,267 acre parcel in the Bridge Creek and Blitzen River WSAs was released from management requirements of section 603(c) of FLPMA under the provisions of the Act and is no longer subject to management under wilderness suitability requirements set forth in that section.
- The 3,840 acre addition to the Basque Hills WSA will be managed under section 603 (c) of FLPMA to protect and enhance the wilderness values of these lands.

Wilderness Areas

- Subject to valid existing rights, the BLM will administer the Steens Mountain Wilderness in accordance with the Wilderness Act, 43CFR 6300, the Management of Designated Wilderness Areas Manual 8560, and the Act.
- Provisions of the BLM wilderness policy in BLM Manual 8560 are as follows:

  1. To provide for the long term protection and preservation of the area's wilderness character under a principle of non-degradation. The area's natural condition, opportunities for solitude, opportunities for primitive and unconfined recreation, and any ecological, geological, or other features of scientific, educational, scenic, or historical value present will be managed so that they will remain unimpaired.

  2. To manage the area for the use and enjoyment of visitors in a manner that will leave the area unimpaired for future use and enjoyment as wilderness. The wilderness resources will be the dominant consideration where a choice must be made between preservation of the wilderness character and visitor use.

  3. To manage the area using the minimum tool, equipment, or structure necessary to successfully, safely, and economically accomplish the objectives. The chosen tool, equipment, or structure will be the one that least degrades wilderness values temporarily or permanently.

  4. To manage nonconforming but acceptable uses permitted by the Wilderness Act and subsequent laws in a manner that will prevent unnecessary or undue degradation of the area's wilderness character and with overall emphasis placed on retaining wilderness character. Proposed actions that may affect wilderness character will be assessed through the appropriate NEPA analysis.

  5. The BLM will only approve that combination of routes and non-motorized modes of travel to nonfederal inholdings that the BLM determines will serve the reasonable purposes for which the nonfederal lands are held or used and cause the least impact on wilderness character.

3.2.16.3 Steens Mountain Cooperative Management and Protection Act

TITLE II – STEENS MOUNTAIN WILDERNESS AREA

SEC. 201. DESIGNATION OF STEENS MOUNTAIN WILDERNESS AREA.

The Federal lands in the Cooperative Management and Protection Area depicted as wilderness on the map entitled "Steens Mountain Wilderness Area" and dated September 18, 2000, are hereby designated as wilderness and therefore as a component of the National Wilderness Preservation System. The wilderness area shall be known as the Steens Mountain Wilderness Area.

SEC. 202. ADMINISTRATION OF WILDERNESS AREA.

(a) GENERAL RULE. – The Secretary shall administer the Wilderness Area in accordance with this title and the Wilderness Act (16 U.S.C. 1131 et seq.). Any reference in the Wilderness Act to the effective date of that Act (or any similar reference) shall be deemed to be a reference to the date of the enactment of this Act.

(b) WILDERNESS BOUNDARIES ALONG ROADS. – Where a wilderness boundary exists along a road, the wilderness boundary shall be set back from the centerline of the road, consistent with the Bureau of Land Management's guidelines as established in its Wilderness Management Policy.

(c) ACCESS TO NON-FEDERAL LANDS. – The Secretary shall provide reasonable access to private lands within the boundaries of the

Wilderness Area, as provided in section 112(d).

(d) GRAZING. –

(1) ADMINISTRATION. – Except as provided in section 113(e)(2), grazing of livestock shall be administered in accordance with the provision of section 4(d)(4) of the Wilderness Act (16 U.S.C. 1133(d)(4), in accordance with the provisions of this Act, and in accordance with the guidelines set forth in Appendices A and B of House Report 101-405 of the 101st Congress.

(2) RETIREMENT OF CERTAIN PERMITS. – The Secretary shall permanently retire all grazing permits applicable to certain lands in the Wilderness Area, as depicted on the map referred to in section 101(a), and livestock shall be excluded form these lands.

SEC. 203. WATER RIGHTS.

Nothing in this Act shall constitute an express or implied claim or denial on the part of the Federal Government as to exception from State water laws.

SEC. 204. TREATMENT OF WILDERNESS STUDY AREAS.

(a) STATUS UNAFFECTED. – Except as provided in section 502, any wilderness study area, or portion of a wilderness study area, within the boundaries of the Cooperative Management and Protection Area, but not included in the Wilderness Area, shall remain a wilderness study area notwithstanding the enactment of this Act.

(b) MANAGEMENT. – The wilderness study areas referred to in subsection (a) shall continue to be managed under section 603(c) of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1782(c)) in a manner so as not to impair the suitability of the areas for preservation as wilderness.

(c) EXPANSION OF BASQUE HILLS WILDERNESS STUDY AREA. – The boundaries of the Basque Hills Wilderness Study Area are hereby expanded to include the Federal lands within sections 8, 16 17, 21, 22, and 27 of township 36 south, range 31 east, Williamette Meridian. These lands shall be managed under section 603(c) of the Federal Lands Policy and Management Act of 1976 (43 U.S.C. 1782(c) to protect and enhance the wilderness values of these lands.

3.2.17 Recreation

3.2.17.1 Andrews Management Framework Plan

Objective: Provide and enhance developed and undeveloped recreation opportunities, while protecting resources, to manage the increasing demand for resource-dependent recreation activities.

- Continue management of existing SRMAs. Implement management plans as appropriate. Manage remaining public land as ERMAs.
- Continue management of existing developed and undeveloped recreation sites and consider their expansion. Develop potential recreation sites to meet high public demand or to provide for public safety or resource protection. Develop tourism opportunities.
- Restrict some recreation uses and use levels to protect resources and enhance recreation opportunities. Authorize SRPs while providing for protection of sensitive resource values.

Recreation Sites - Campgrounds are maintained at Page Springs, Jackman Park, South Steens, and Fish Lake. Primitive camping areas are provided at Mann Lake. The campground at Blitzen Crossing has been closed to provide for the area's restoration and to resolve conflicts with riparian zone management.

Interpretive Sites - An interpretive program and visitor management plan would be developed for Steens Mountain. Sites of interest would be identified and interpretive material developed to enhance the recreational experience.

Hunting and Fishing Opportunities - The quality of hunting and fishing opportunities would be enhanced by the proposed management for wildlife and fish habitat.

High Desert Trail - A route for the High Desert Trail has been established through the Pueblo and Steens Mountains. A trail corridor along the ridge between Little Blitzen and Big Indian Gorges was established in lieu of Little Blitzen Canyon due to the sensitivity of the riparian zone. The trail crosses the river at Big

Spring and then continues down the west side of the river.

Winter Use Area -Motorized winter use in the Steens is allowed along the north section of the Steens Mountain Back Country Byway. During winter, the gates are locked. A permit and key must be obtained from the BLM for use by winter recreationists wanting to drive to the snow line on the Steens Mountain Back Country Byway.

3.2.17.2 Steens Mountain Cooperative Management and Protection Act

- Recreation management will continue, consistent with the Act, the Wilderness Act, the Wild and Scenic Rivers Act, and other applicable existing land use plans and regulations.
- Recreation facilities will continue to provide quality recreation and protect public health and safety.
- Existing special recreation use permits will continue, when consistent with the Act. Stipulations may be developed on current Burns District Special Recreation Permits (SRPs) within the Steens Mountain CMPA to ensure consistency with the Act and the land designations of the Act. Wilderness-specific permit stipulations may be developed if necessary to ensure compliance with the Wilderness Act. SRPs will be administered in conformance with the Act and applicable laws, policies, and plans. Commercial Day Use permit stipulations will be developed as appropriate to assure consistency with the Act and the land designations of the Act.

3.2.18 Visual Resources

3.2.18.1 Andrews Management Framework Plan

Objective: Manage public land actions and activities in a manner to be consistent with VRM Class Objectives.

- Manage all WSAs and Steens Mountain Wilderness as VRM Class I.
- Manage designated NWSRs classified as wild river areas as VRM Class I.
- Manage ACECs as prescribed in the MFP or subsequent amendments to that plan.
- Maintain existing MFP VRM classifications in all other areas.

3.2.18.2 Interim Management Policy

- The Steens Mountain Wilderness, the previously existing and new WSRs, and the existing WSAs within the Steens Mountain CMPA will be managed as VRM Class I in accordance with current BLM policy.
- The remainder of the lands in the Steens Mountain CMPA will be managed according to the existing VRM Class designations.

3.2.19 Lands, Realty and Rights-of-Way

3.2.19.1 Andrews Management Framework Plan

Objective: Retain public land with high public resource values. Consolidate public landholdings and acquire land or interests in land with high public resource values to ensure effective administration and improve resource management. Acquired land would be managed for the purposes for which it was acquired. Make available for disposal public land within Zone 3.

- Make land tenure adjustments consistent with existing planning documents with emphasis on acquiring land with high public resource values.
- Acquire interests in land on a case-by-case basis as needed.
- Make available for sale land specifically identified for disposal in the existing planning documents.
- Determine management of acquired land on a case-by-case basis.

Objective 2: Establish utility and transportation system corridor routes to the extent possible, considering avoidance areas, consistent with resource objectives.

- Continue corridor designations on facilities identified in existing MFPs. The location of these corridors is the result of decisions made in the MFP, Statewide Wilderness EIS (December 1989), and the Western Regional Corridor Study.
- Continue with the proposed ROW corridor as listed in the Western Regional Corridor Study without modifications and as identified in the existing MFP.

Existing Utility Corridors - Harney Electric Cooperative Lines

- 115 KV transmission line from Frenchglen to Fields, paralleling State Highway 205 and county road.

- 115 KV transmission line from Fields, east near Whitehorse Ranch, to the Vale District boundary.
- 115 KV transmission line form Fields to Denio, Nevada, paralleling county road.

Proposed Utility Corridor

- Pacific Power and Light Company (PP&L) - The newly proposed corridor would be modified slightly in the existing plan. The corridor would follow PP&L's proposed route from the Lakeview District boundary to Long Hollow. It would follow Harney Electric's route 1 through Lone Hollow to Fields. From Fields, the corridor would follow Harney Electric route 2 to Calderwood Desert Well. It would then follow a northeastern route crossing the Vale District boundary four miles north of the existing transmission line.
- Bonneville Power Administration - The proposed BPA corridor will follow the same route as the PP&L corridor described above.

Existing Transportation Corridors

- County road from Folly Farm (on State Highway 78) to Denio.
- County road from Fields to Roaring Springs Ranch.
- County road from Trout Creek to Whitehorse Ranch.
- State Highway 205.
- County road from Denio to Trout Creek via Cottonwood Creek.
- County and BLM road from "P" Hill area to Hart Mountain Refuge.
- County road from Riecken's Corner to Jack Mountain Road.
- State Highway 78.

3.2.19.2 Steens Mountain Cooperative Management and Protection Act

SEC. 112. ROADS AND TRAVEL ACCESS.

(d) PROHIBITION ON NEW CONSTRUCTION. –

(1) PROHIBITION, EXCEPTION. – No new road or trail for motorized or mechanized vehicles may be constructed on Federal lands in the Cooperative Management and Protection Area unless the Secretary determines that the road or trail is necessary for public safety or protection of the environment. Any determination under this subsection shall be made in consultation with the advisory council and the public.

(2) TRAILS. – Nothing in this subsection is intended to limit the authority of the Secretary to construct or maintain trails for nonmotorized or nonmechanized use.

(e) ACCESS TO NONFEDERALLY OWNED LANDS. –

(1) REASONABLE ACCESS. – The Secretary shall provide reasonable access to nonfederally owned lands or interests in land within the boundaries of the Cooperative Management and Protection Area and the Wilderness Area to provide the owner of the land or interest the reasonable use thereof.

(2) EFFECT ON EXISTING RIGHTS-OF-WAY. – Nothing in this Act shall have the effect of terminating any valid existing right-of-way on Federal lands included in the Cooperative Management and Protection Area.

(f) PROHIBITION ON CONSTRUCTION OF FACILITIES. – No new facilities may be constructed on Federal lands included in the Cooperative Management and Protection Area unless the Secretary determines that the structure –

(1) will be minimal in nature;

(2) is consistent with the purposes of this Act; and

(3) is necessary –

(A) for enhancing botanical, fish, wildlife, or watershed conditions;

(B) for public information, health, or safety;

(C) for the management of livestock; or

(D) for the management of recreation, but not for the promotion of recreation.

(g) WITHDRAWAL. – Subject to valid existing rights, the Federal lands and interests in lands included in the Cooperative Management and Protection Area are hereby withdrawn from all forms of entry, appropriation, or disposal under the public land laws, except in the case of land exchanges if the Secretary determines that the exchange furthers the purpose and objectives specified in section 102 and so certifies to Congress.

SEC. 114. LAND ACQUISITION AUTHORITY.

(a) ACQUISITION. –

(1) ACQUISITION AUTHORIZED. – In addition to the land acquisitions authorized by title VI, the Secretary may acquire other non-Federal lands and interests in lands located within the boundaries of the Cooperative Management and Protection Area or the Wilderness Area.

(2) ACQUISITION METHODS. – Lands may be acquired under the subsection only by voluntary exchange, donation, or purchase from willing sellers.

(b) TREATMENT OF ACQUIRED LANDS. –

(1) IN GENERAL. – Subject to paragraphs (2) and (3), lands or interests in lands acquired under subsection (a) or title VI that are located within the boundaries of the Cooperative Management and Protection Area shall –

(A) become part of the Cooperative Management and Protection Area, and

(B) be managed pursuant to the laws applicable to the Cooperative Management and Protection Area.

(2) LANDS WITHIN WILDERNESS AREA. – If lands or interests in lands acquired under subsection (a) or title VI are within the boundaries of the Wilderness Area, the acquired lands or interest in lands shall –

(A) become part of the Wilderness Area; and

(B) be managed pursuant to title II and the other laws applicable to the Wilderness Area.

(3) LANDS WITHIN WILDERNESS STUDY AREA. – If the lands or interests in lands acquired under subsection (a) or title IV are within the boundaries of a wilderness study area, the acquired lands or interests in lands shall –

(A) become part of that wilderness study area; and

(B) be managed pursuant to the laws applicable to that wilderness study area.

(c) APPRAISAL. – In appraising non-Federal land, development rights, or conservation easements for possible acquisition under this section or section 122, the Secretary shall disregard any adverse impacts on values resulting from the designation of the Cooperative Management and Protection Area or the Wilderness Area.

SEC. 122. COOPERATIVE EFFORTS TO CONTROL DEVELOPMENT AND ENCOURAGE CONSERVATION.

(a) POLICY.—Development on public and private lands within the boundaries of the Cooperative Management and Protection Area which is different from the current character and uses of the lands is inconsistent with the purposes of this Act.

(b) USE OF NON-DEVELOPMENT AND CONSERVATION EASEMENTS. The Secretary may enter into a non-development easement or conservation easement with willing landowners to further the purposes of this Act.

(c) CONSERVATION INCENTIVE PAYMENTS.—The Secretary may provide technical assistance, cost-share payments, incentive payments, and education to a private landowner in the Cooperative Management and Protection Area who enters into a contract with the Secretary to protect or enhance ecological resources on the private land covered by the contract if those protections or enhancements benefit public lands.

(d) RELATION TO PROPERTY RIGHTS AND STATE AND LOCAL LAW.—Nothing in this Act is intended to affect rights or interests in real property or supersede State law.

202. ADMINISTRATION OF WILDERNESS AREA.

(c) ACCESS TO NON-FEDERAL LANDS.—The Secretary shall provide reasonable access to private lands within the boundaries of the Wilderness Area, as provided in section 112(d).

SEC. 401. DESIGNATION OF MINERAL WITHDRAWAL AREA.

(a) DESIGNATION.—Subject to valid existing rights, the Federal lands and interests in lands included within the withdrawal boundary as depicted on the map referred to in section 101(a) are hereby withdrawn from—

(1) location, entry and patent under the mining laws; and

(2) operation of the mineral leasing and geothermal leasing laws and from the minerals materials laws and all amendments thereto except as specified in subsection (b).

(b) ROAD MAINTENANCE.—If consistent with the purposes of this Act and the management plan for the Cooperative Management and Protection Area, the Secretary may permit the development of saleable mineral resources, for road maintenance use only, in those locations identified on the map referred to in section 101(a) as an existing ''gravel pit'' within the mineral withdrawal bound-aries (excluding the Wilderness Area, wilderness study areas, and designated segments of the National Wild and Scenic Rivers System) where such development was authorized before the date of the enactment of this Act.

SEC. 402. TREATMENT OF STATE LANDS AND MINERAL INTERESTS.

(a) ACQUISITION REQUIRED.—The Secretary shall acquire, for approximately equal value and as agreed to by the Secretary and the State of Oregon, lands and interests in lands owned by the State within the boundaries of the mineral withdrawal area designated pursuant to section 401.

(b) ACQUISITION METHODS.—The Secretary shall acquire such State lands and interests in lands in exchange for—

(1) Federal lands or Federal mineral interests that are outside the boundaries of the mineral withdrawal area;

(2) a monetary payment to the State; or

(3) a combination of a conveyance under paragraph (1) and a monetary payment under paragraph (2).

SEC. 601. LAND EXCHANGE, ROARING SPRINGS RANCH.

(a) EXCHANGE AUTHORIZED.—For the purpose of protecting and consolidating Federal lands within the Cooperative Management and Protection Area, the Secretary may carry out a land exchange with Roaring Springs Ranch, Incorporated, to convey all right, title, and interest of the United States in and to certain parcels of land under the jurisdiction of the Bureau of Land Management in the vicinity of Steens Mountain, Oregon, as depicted on the map referred to in section 605(a), consisting of a total of approximately 76,374 acres in exchange for the private lands described in subsection (b).

(b) RECEIPT OF NON-FEDERAL LANDS.—As consideration for the conveyance of the Federal lands referred to in subsection (a) and the disbursement referred to in subsection (d), Roaring Springs Ranch, Incorporated, shall convey to the Secretary parcels of land consisting of approximately 10,909 acres, as depicted on the map referred to in section 605(a), for inclusion in the Wilderness Area, a wilderness study area, and the no livestock grazing area as appropriate.

(c) TREATMENT OF GRAZING.—Paragraphs (2) and (3) of section 113(e), relating to the effect of the cancellation in part of grazing permits for the South Steens allotment in the Wilderness Area. R. 4828—17 and reassignment of use areas as described in paragraph (3)(C) of such section, shall apply to the land exchange authorized by this section.

(d) DISBURSEMENT.—Upon completion of the land exchange authorized by this section, the Secretary is authorized to make a disbursement to Roaring Springs Ranch, Incorporated, in the amount of $2,889,000.

(e) COMPLETION OF CONVEYANCE.—The Secretary shall complete the conveyance of the Federal lands under subsection (a) within 70 days after the Secretary accepts the lands described in subsection (b).

SEC. 602. LAND EXCHANGES, C.M. OTLEY AND OTLEY BROTHERS.

(a) C. M. OTLEY EXCHANGE.—

(1) EXCHANGE AUTHORIZED.—For the purpose of protecting and consolidating Federal lands within the Cooperative Management and Protection Area, the Secretary may carry out a land exchange with C. M. Otley to convey all right, title, and interest of the United States in and to certain parcels of land under the jurisdiction of the Bureau of Land Management in the vicinity of Steens Mountain, Oregon, as depicted on the map referred to in section 605(a), consisting of a total of approximately 3,845 acres in exchange for the private lands described in paragraph (2).

(2) RECEIPT OF NON-FEDERAL LANDS.—As consideration for the conveyance of the Federal lands referred to in paragraph (1) and the disbursement referred to in paragraph (3), C. M. Otley shall convey to the Secretary a parcel of land in the headwaters of Kiger gorge consisting of approximately 851 acres, as depicted on the map referred to in section 605(a), for inclusion in the Wilderness Area and the no livestock grazing area as appropriate.

(3) DISBURSEMENT.—Upon completion of the land exchange authorized by this subsection, the Secretary is authorized to make a disbursement to C.M. Otley, in the amount of $920,000.

(b) OTLEY BROTHERS EXCHANGE.—

(1) EXCHANGE AUTHORIZED.—For the purpose of protecting and consolidating Federal lands within the Cooperative Management and Protection Area, the Secretary may carry out a land exchange with the Otley Brothers, Inc., to convey all right, title, and interest of the United States in and to certain parcels of land under the jurisdiction of the Bureau of Land Management in the vicinity of Steens Mountain, Oregon, as depicted on the map referred to in section 605(a), consisting of a total of approximately 6,881 acres in exchange for the private lands described in paragraph (2).

(2) RECEIPT OF NON-FEDERAL LANDS.—As consideration for the conveyance of the Federal lands referred to in paragraph (1) and the disbursement referred to in subsection (3), the Otley Brothers, Inc., shall convey to the Secretary a parcel of land in the headwaters of Kiger gorge consisting of approximately 505 acres, as depicted

on the map referred to in section 605(a), for inclusion in the Wilderness Area and the no livestock grazing area as appropriate.

(3) DISBURSEMENT.—Upon completion of the land exchange authorized by this subsection, the Secretary is authorized to. R. 4828—18 make a disbursement to Otley Brothers, Inc., in the amount of $400,000.

(c) COMPLETION OF CONVEYANCE.—The Secretary shall complete the conveyances of the Federal lands under subsections (a) and (b) within 70 days after the Secretary accepts the lands described in such subsections.

SEC. 603. LAND EXCHANGE, TOM J. DAVIS LIVESTOCK, INCORPORATED.

(a) EXCHANGE AUTHORIZED.—For the purpose of protecting and consolidating Federal lands within the Wilderness Area, the Secretary may carry out a land exchange with Tom J. Davis Livestock, Incorporated, to convey all right, title, and interest of the United States in and to certain parcels of land under the jurisdiction of the Bureau of Land Management in the vicinity of Steens Mountain, Oregon, as depicted on the map referred to in section 605(a), consisting of a total of approximately 5,340 acres in exchange for the private lands described in subsection (b).

(b) RECEIPT OF NON-FEDERAL LANDS.—As consideration for the conveyance of the Federal lands referred to in subsection (a) and the disbursement referred to in subsection (c), Tom J. Davis Livestock, Incorporated, shall convey to the Secretary a parcel of land consisting of approximately 5,103 acres, as depicted on the map referred to in section 605(a), for inclusion in the Wilderness Area.

(c) DISBURSEMENT.—Upon completion of the land exchange authorized by this section, the Secretary is authorized to make a disbursement to Tom J. Davis Livestock, Incorporated, in the amount of $800,000.

(d) COMPLETION OF CONVEYANCE.—The Secretary shall complete the conveyance of the Federal lands under subsection (a) within 70 days after the Secretary accepts the lands described in subsection (b).

SEC. 604. LAND EXCHANGE, LOWTHER (CLEMENS) RANCH.

(a) EXCHANGE AUTHORIZED.—For the purpose of protecting and consolidating Federal lands within the Cooperative Management and Protection Area, the Secretary may carry out a land exchange with the Lowther (Clemens) Ranch to convey all right, title, and interest of the United States in and to certain parcels of land under the jurisdiction of the Bureau of Land Management in the vicinity of Steens Mountain, Oregon, as depicted on the map referred to in section 605(a), consisting of a total of approximately 11,796 acres in exchange for the private lands described in sub-section (b).

(b) RECEIPT OF NON-FEDERAL LANDS.—As consideration for the conveyance of the Federal lands referred to in subsection (a) and the disbursement referred to in subsection (d), the Lowther (Clemens) Ranch shall convey to the Secretary a parcel of land consisting of approximately 1,078 acres, as depicted on the map referred to in section 605(a), for inclusion in the Cooperative Management and Protection Area.

(c) TREATMENT OF GRAZING.—Paragraphs (2) and (3) of section 113(e), relating to the effect of the cancellation in whole of the grazing permit for the Fish Creek/Big Indian allotment in the Wilderness Area and reassignment of use areas as described in paragraph (3)(D) of such section, shall apply to the land exchange authorized by this section.

(d) DISBURSEMENT.—Upon completion of the land exchange authorized by this section, the Secretary is authorized to make. R. 4828—19 a disbursement to Lowther (Clemens) Ranch, in the amount of $148,000.

(e) COMPLETION OF CONVEYANCE.—The Secretary shall

complete the conveyance of the Federal lands under subsection (a) within 70 days after the Secretary accepts the lands described in subsection (b).

SEC. 605. GENERAL PROVISIONS APPLICABLE TO LAND EXCHANGES.

(a) MAP.—The land conveyances described in this title are generally depicted on the map entitled ''Steens Mountain Land Exchanges'' and dated September 18, 2000.

(b) APPLICABLE LAW.—Except as otherwise provided in this section, the exchange of Federal land under this title is subject to the existing laws and regulations applicable to the conveyance and acquisition of land under the jurisdiction of the Bureau of Land Management. It is anticipated that the Secretary will be able to carry out such land exchanges without the promulgation of additional regulations and without regard to the notice and comment provisions of section 553 of title 5, United States Code.

(c) CONDITIONS ON ACCEPTANCE.—Title to the non-Federal lands to be conveyed under this title must be acceptable to the Secretary, and the conveyances shall be subject to valid existing rights of record. The non-Federal lands shall conform with the title approval standards applicable to Federal land acquisitions

(d) LEGAL DESCRIPTIONS.—The exact acreage and legal description of all lands to be exchanged under this title shall be determined by surveys satisfactory to the Secretary. The costs of any such survey, as well as other administrative costs incurred to execute a land exchange under this title, shall be borne by the Secretary.

SEC. 702. USE OF LAND AND WATER CONSERVATION FUND.

(a) AVAILABILITY OF FUND.—There are authorized to be appropriated $25,000,000 from the land and water conservation fund established under section 2 of the Land and Water Conservation Fund Act of 1965 (16 U.S.C. 460l–5) to provide funds for the acquisition of land and interests in land under section 114 and to enter into non-development easements and conservation easements under subsections (b) and (c) of section 122.

3.2.20 Off-Highway Vehicles

3.2.20.1 Andrews Management Framework Plan

Off-Highway Vehicles - Objective: Manage OHV use to protect resource values, promote public safety, provide OHV use opportunities where appropriate, and minimize conflicts among various users.

- OHVs are managed in accordance with existing open, limited, and closed OHV use designations.
- Organized OHV events are allowed when consistent with protection of resource values.
- In WSAs, all motorized and mechanical vehicles are limited to designated routes and designated open area.

3.2.20.2 Interim Management Policy

Transportation System Management

- Under section 112 of the Act, motorized and mechanical vehicle use on federal lands within the Steens Mountain CMPA is prohibited off road except for certain administrative uses and emergencies.
- Existing seasonal and travel route closures within the Steens Mountain CMPA will remain in effect. OHV designations for WSAs and other public lands identified in the February 20, 1987 Federal Register Notice will also remain in effect.
- Designation of the Steens Mountain Wilderness by the Act resulted in closure of the Wilderness to all OHV use except where specifically authorized by the BLM for protection of human life, safety, and property (43 CFR sec. 6302.20 and 6303.1), and as may be authorized under the Wilderness Act and House Report 101-405 (Arizona Desert Wilderness Act).
- All ways or vehicular routes within the Steens Mountain Wilderness will be closed to motorized or mechanized use except under the terms provided in sections 112(b)(2), 112(e)(1), and 202(d)(1) in the Act.
- Methods of closure will be determined by feasibility, access needs, and intent of the Act.

3.2.20.3 Steens Mountain Cooperative Management and Protection Act

SEC. 112. ROADS AND TRAVEL ACCESS.

(a) TRANSPORTATION PLAN. – The management plan shall include, as an integral part, a comprehensive transportation plan for the Federal lands included in the Cooperative Management and Protection Area, which shall address the maintenance, improvement, and closure of roads and trails as well as travel access.

(b) PROHIBITION ON OFF-ROAD MOTORIZED TRAVEL. –

(1) PROHIBITION. – The use of motorized or mechanized vehicles on Federal lands included in the Cooperative Management and Protection Area –

(A) is prohibited off road;

(B) is limited to such roads and trails as may be designed for their use as part of the management plan.

(2) EXCEPTIONS. – Paragraph (1) does not prohibit the use of motorized or mechanized vehicles on Federal lands included in the Cooperative Management and Protection Area if the Secretary determines that such use –

(A) is needed for administrative purposes or to respond to an emergency; or

(B) is appropriate for the construction or maintenance of agricultural facilities, fish and wildlife management, or ecological restoration projects, except in areas designated as wilderness or managed under the provisions of section 603(c) of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1782).

(c) ROAD CLOSURES. – Any determination to permanently close an existing road in the Cooperative Management and Protection Area or to restrict the access of motorized or mechanized vehicles on certain roads shall be made in consultation with the advisory council and the public.

(d) PROHIBITION ON NEW CONSTRUCTION. –

(1) PROHIBITION, EXCEPTION. – No new road or trail for motorized or mechanized vehicles may be constructed on Federal lands in the Cooperative Management and Protection Area unless the Secretary determines that the road or trail is necessary for public safety or protection of the environment. Any determination under this subsection shall be made in consultation with the advisory council and the public.

(2) TRAILS. – Nothing in this subsection is intended to limit the authority of the Secretary to construct or maintain trails for nonmotorized or nonmechanized use.

(e) ACCESS TO NONFEDERALLY OWNED LANDS. –

(1) REASONABLE ACCESS. – The Secretary shall provide reasonable access to nonfederally owned lands or interests in land within the boundaries of the Cooperative Management and Protection Area and the Steens Mountain Wilderness to provide the owner of the land or interest the reasonable use thereof.

(2) EFFECT ON EXISTING RIGHTS-OF-WAY. – Nothing in this Act shall have the effect of terminating any valid existing right-of-way on Federal lands included in the Cooperative Management and Protection Area.

3.2.21 Minerals

3.2.21.1 Andrews Management Framework Plan

Objective 1: Provide opportunities for exploration and development of leasable energy and mineral resources while protecting other sensitive resources. The Mineral

Withdrawal Area, Steens Mountain Wilderness, WSAs, and designated WSRs are closed or withdrawn from leasable mineral entry by Congressional action for 1,181,362 acres.

- Open the planning area to energy and mineral leasing, except near streams administratively suitable for designation as wild under the NWSR System.
- Prior to leasing, areas where a No Surface Occupancy (NSO) stipulation is to be applied will be identified in order to protect sensitive areas. These may include areas along streams administratively suitable for designation as scenic or recreational under the NWSR System, or significant cultural sites.
- Prior to leasing, areas would be identified where seasonal and/or other special stipulations would be applied. These may include areas within 0.5 miles of identified sage-grouse leks, big game winter range (elk, mule deer, pronghorn antelope, and California bighorn sheep), areas of special status plant and animal species and their essential habitats, and riparian and wetland areas.
- Standard stipulations would be applied to all other lands in the Andrews Planning Area. Under standard stipulations, a drill rig may be moved up to 200 meters (1/8 mile) in order to protect sensitive resources, including visual resources.

Objective 2: Provide opportunities for exploration and development of locatable mineral resources while protecting other sensitive resources. The Mineral Withdrawal Area, Steens Mountain Wilderness, and designated wild segments of WSRs are closed to mineral location by Congressional action (a total of 748,119 acres). Six grandfathered claims covering 120 acres are located in the Mineral Withdrawal Area. In WSAs outside of the Mineral Withdrawal Area (433,243 acres), claims may be located but no surface-disturbing mineral activity requiring reclamation is authorized until Congress acts to designate all, part, or none of the WSAs as wilderness. No WSAs in the RMP Planning Area contain pre-1976 claims providing "grandfathered" or "valid existing" rights.

- Open the planning area to mineral location and development, except near streams administratively suitable as wild under the NWSR System. In these areas, withdrawal would be pursued.

Objective 3: Provide for public demand for saleable minerals from public land while protecting sensitive resources. The Mineral Withdrawal Area is closed to saleable mineral disposal by congressional action except for materials sites identified in the Act. Some of those identified sites are in exchanged land or are exhausted and in reclamation status, leaving seven materials sources within the Mineral Withdrawal Area open to saleable mineral disposal. Subtracting the seven materials source areas (515 acres) from the BLM acreage within the Andrews Planning and Mineral Withdrawal Areas (748,119 acres), 747,604 acres are closed to saleable mineral disposal. WSAs and designated WSRs are closed to saleable mineral disposal outside the Mineral Withdrawal Area for 433,243 acres.

- The planning area will remain open to saleable mineral development except in areas where unacceptable conflicts exist, as determined by interdisciplinary site-specific review. No saleable mineral development would be allowed along streams administratively suitable as WSRs under the NWSR System, special status plant sites, and in significant cultural sites. Due to resource concerns, no tracts of land for flat rock removal have been designated in the Andrews RMP.

The current national minerals management policy encourages exploration and development of domestic energy and mineral sources. Under the existing plan, public lands would be kept open for exploration, development or collection of mineral resources, while maintaining natural systems and protecting sensitive areas.

3.2.21.2 Interim Management Policy

- A mineral withdrawal area is identified in Title IV of the Act and depicted on the map referred to in Section 101(a) (in the Act). The terms of the withdrawal are specified in section 401 of the Act which states, "Subject to valid existing rights, the federal lands and interests in lands included within the withdrawal boundary...are hereby withdrawn from location, entry, and patent under the mining laws; and operation of mineral leasing and geothermal leasing laws..." "If consistent with the purposes of the Act....the [BLM] may permit the development of salable mineral resources, for road maintenance use only, in those locations identified on the map referred to in Section 101(a) as an existing "gravel pit" within the mineral withdrawal boundaries...where such development was

authorized before the date of the enactment of the Act."

- Activities on existing valid mining claims may continue under valid existing rights in accordance with the Act and other existing laws and regulations.
- Abandoned mine land will continue to be rehabilitated to meet safety standards as time and money allow.

3.2.21.3 Steens Mountain Cooperative Management and Protection Act

SEC. 402. TREATMENT OF STATE LANDS AND MINERAL INTERESTS.

(a) ACQUISITION REQUIRED. – The Secretary shall require, for approximately equal value and as agreed to by the Secretary and the State of Oregon, lands and interests in lands owned by the State within the boundaries of the mineral withdrawal area designated pursuant to section 401.

(b) ACQUISITION METHODS. – The Secretary shall acquire such State lands and interests in lands in exchange for –

1) Federal lands or Federal mineral interests that are outside the boundaries of the mineral withdrawal area;

(2) a monetary payment to the State; or

(3) a combination of a conveyance under paragraph (1) and a monetary payment under paragraph (2).

3.2.22 Cultural Resources

3.2.22.1 Andrews Management Framework Plan

Objective 1: Protect and conserve cultural and paleontological resources.

- Protect against illegal artifact collection, site excavation, and vandalism by patrolling potential *National Register* eligible sites and subregions having established enforcement needs, such as Pueblo Valley, Catlow Valley, and the Frenchglen vicinity.
- Stabilize and restore historic buildings and structures within the Riddle Brothers Ranch Historic District according to the Cultural Resource Management Plan (CRMP).

Objective 2: Increase the public's knowledge of, appreciation for, and sensitivity to cultural and paleontological resources.

- Provide on- or off-site interpretation of the Riddle Brothers Ranch Historic District.

Objective 3: Consult and coordinate with Native American groups to ensure their interests are considered and their traditional religious sites, land forms and resources are taken into account.

- Limit land treatments, the construction of short- or long-term livestock holding facilities, livestock salt grounds, livestock watering troughs, and the harvest of standing trees or portions of standing trees for posts, boughs, or fuelwood within identified Native American Indian root gathering areas.
- Manage Native American Indian traditional use areas identified on public land to allow for the continuation of such uses. Retain all such areas in federal ownership.
- On a case-by-case basis, consider American Indian requests to practice traditional activities on specific public land not identified in this plan. Where practicable, allow for traditional uses of such public land by Native Americans.
- Develop activity plans on a case-by-case basis for Native American traditional use areas, when identified, in consultation with the affected tribes.

3.2.22.2 Interim Management Policy

- Personal tribal consultation primarily with the Burns Paiute Tribe will occur frequently in order to keep the tribe aware of Steens Mountain CMPA issues.
- Consultation on individual projects or actions will occur as the need arises. Efforts to protect tribal traditional use areas will continue where required.
- Steens Mountain CMPA related projects or actions will continue to receive cultural resources inventories prior to implementation.
- Scientific archaeological investigations involving surface disturbance such as testing and excavation will continue to be managed under existing policy and regulation, consistent with the purposes and objectives of the Act.

- In the Riddle Brothers Ranch National Historic District, management and interpretation efforts such as on and off-site signing, historic structure stabilization, restoration, and fire protection may continue as necessary to protect historic resources.

3.2.23 Human Uses and Values

3.2.23.1 Andrews Management Framework Plan

Objective: Manage public land and pursue partnerships to provide social and economic benefits to local residents, businesses, visitors, and for future generations.

- Continue current management, resource allocations, and work cooperatively with private, community, and local government groups to continue to provide for customary uses consistent with other resource objectives.

3.3 Management Direction Carried Forward in the Resource Management Plan

This section describes the existing management direction that is being carried forward without modification from the existing plans and associated NEPA documents applicable to the Planning Area.

In addition to the plans and documents outlined in Section 3.1, several activity plans have been completed in recent years. These include ACEC management plans, a resource area-wide fire management plan, an OHV management plan, mining plans of operation, allotment management plans, habitat management plans, a noxious weed management plan, and wild horse herd management plans.

In addition to the direction in the Andrews MFP, IMP, and the Act, various resource programs are directed by laws such as the Clean Water Act, the Endangered Species Act, the National Heritage Preservation Act, the Wild and Free-Roaming Horse and Burro Act, the Taylor Grazing Act, the Act, and other legislation. Also, FLPMA provides the basic authority and management direction for all BLM programs with particular direction regarding land-use planning, wilderness management, and lands and realty. BLM manuals, handbooks, and policy memos provide additional specific guidance for the various programs. This direction is incorporated into the general and specific planning criteria for the RMP/EIS.

Recommendations brought forward from the MFPs have not undergone an environmental analysis in all cases. Those recommendations carried into the RMP/EIS process will be incorporated into the various alternatives as management direction and analyzed in the EIS. Decisions carried forward from plan amendments, other EISs, or environmental assessments need no further environmental analysis.

The following sections describe goals and objectives as well as elements created by legislation for the Andrews Management Unit and Steens Mountain CMPA.

3.3.1 General Andrews Management Unit Goals and Objectives

1. The Andrews MU shall be managed by the BLM to protect resources in accordance with FLPMA and other applicable laws and regulations.
2. The Andrews MU shall be managed in accordance with all existing public land law.
3. Subject to valid existing rights, all land within the Mineral Withdrawal Area is withdrawn from location, entry, and patent under the mining laws and from disposition under all laws relating to mineral and geothermal leasing.
4. Hunting and fishing are permitted within the Andrews MU in accordance with applicable federal and state laws with the exception that the BLM, in conjunction with the ODFW, may designate no hunting zones for reasons concerning public safety, administration or public use and enjoyment.
5. OHV use in the Andrews MU shall be allowed to the extent that usage conforms with site-specific area designations and is compatible with OHV management as described in the BLM's OHV National Management Strategy for Motorized Off-Highway Vehicle Use on Public Lands. This strategy took effect in January 2001.
6. Resources in the Andrews MU will be managed in accordance with all BLM guidance and policies.

3.3.2 Goals and Objectives Specific to the Steens Mountain Cooperative Management and Protection Area

1. To manage the Steens Mountain CMPA to conserve, protect, and manage the long-term ecological integrity of Steens Mountain for present and future generations;
2. To maintain and enhance cooperative and innovative management projects, programs, and agreements between tribal, public, and

private interests in the Steens Mountain CMPA;

3. To promote grazing, recreation, historic, and other sustainable uses;
4. To conserve, protect and ensure traditional access to cultural, gathering, religious, and archaeological sites on public land within the Steens Mountain CMPA by members of the Burns Paiute Tribe and to promote cooperation with private landowners;
5. To ensure the conservation, protection, and improved management of the ecological, social, and economic environment of the Steens Mountain CMPA, including geological, biological, wildlife, riparian, and scenic resources;
6. To promote and foster cooperation, communication, and understanding and to reduce conflict between Steens Mountain users and interests; and
7. To ensure that a monitoring program for public land within the Steens Mountain CMPA will be implemented in order to determine progress toward ecological integrity objectives.

3.3.3 Elements Created by Legislation to Support the Goals and Objectives of the Steens Mountain Cooperative Management and Protection Area

1. The Steens Mountain Wilderness consisting of 169,465 acres of public land was established and will be managed such that:

    a. Subject to valid existing rights, the Steens Mountain Wilderness shall be administered by the BLM in accordance with the Wilderness Act (16 U.S.C. 1131 et seq.).
    b. The jurisdiction or responsibilities of the State of Oregon, with respect to wildlife and fish on the public land within the Steens Mountain Wilderness, will not be affected by the Act.
    c. No expressed or implied reservation of water for any purpose was created by the Act, and water rights in existence prior to the enactment date are not affected by the Act.
    d. Any new water right determined necessary for purposes of the Act must be established under the procedures and substantive requirements of Oregon law.

2. Additional Management Goals for the Steens Mountain Wilderness Pursuant to BLM Wilderness Policy are to:

    a. Provide for the long-term protection and preservation of the area's wilderness character under a principle of non-degradation. The area's natural condition, opportunities for solitude, opportunities for primitive and unconfined types of recreation, and any ecological, geological or other features of scientific, educational, scenic or historical value will be managed so they will remain unimpaired.
    b. Manage the area for the use and enjoyment of visitors in a manner that will leave the area unimpaired for future use and enjoyment as wilderness. The wilderness resources will be dominant in all management decisions where a choice must be made between preservation of the wilderness character and visitor use.
    c. Manage the area using the minimum tool, equipment or structure necessary to successfully, safely, and economically accomplish the objectives. The chosen tool, equipment or structure should be the one that least degrades wilderness values temporarily or permanently. Management will seek to preserve spontaneity of use and as much freedom from regulation as possible.
    d. Manage nonconforming but acceptable uses permitted by the Wilderness Act and subsequent laws in a manner that will prevent unnecessary or undue degradation of the area's wilderness character. Nonconforming uses are the exception rather than the rule; therefore, emphasis is placed on wilderness character.
    e. The 3,267-acre parcel of the Blitzen River and Bridge Creek WSAs is released from WSA status and is no longer subject to management under "wilderness suitability" requirements set forth under section 603 of FLPMA. The 3,840-acre addition to the Basque Hills WSA, however,

will be managed for "wilderness suitability."

f. The Act designated the Steens Mountain Wilderness as "closed" to OHV use and the remainder of the Steens Mountain CMPA as prohibiting off-road travel.

3. The Redband Trout Reserve was created to conserve, protect, and enhance Redband trout and the unique ecosystem; and to provide opportunities for research, education, and fish and wildlife-oriented recreation. The reserve consists of the Donner und Blitzen WSR above its confluence with Fish Creek and the adjacent riparian areas on public land within the Steens Mountain Wilderness.

4. An area consisting of 97,671 acres of public land within the Steens Mountain Wilderness will be managed as a No Livestock Grazing Area (Section 113 of Act).

5. The WJMA consisting of 3,267 acres of public land will be used for experimentation, education, interpretation, and demonstration of management techniques for restoration of historic fire regime and native vegetation communities.

6. Kiger Creek (4.25 miles), Wildhorse Creek (7.36 miles), and Little Wildhorse Creek (2.60 miles) were designated as new WSRs. Additional segments of the Donner und Blitzen WSR including Ankle Creek (8.10 miles), South Fork of Ankle Creek (1.60 miles), and Mud Creek (5.10 miles) were also designated. These additions provide a total of 103.65 miles of WSR within the Steens Mountain CMPA.

7. Five specific land exchanges were authorized under Title VI of the Act. Sec. 402 further requires federal acquisition of all state lands and interests within the mineral withdrawal area, which includes the entire CMPA. The Act also provides for future acquisitions within the boundaries of the Steens Mountain CMPA by voluntary exchange, donation or purchase from willing sellers. The purposes of these provisions are to minimize private land within the Wilderness Area and to protect and consolidate public landownership within the Steens Mountain CMPA.

8. The SMAC will be established to advise the BLM on managing the Steens Mountain CMPA and promoting cooperative management. The SMAC shall utilize sound science, existing plans, and other tools to formulate recommendations regarding new and unique approaches to the management of land within the boundaries of the Steens Mountain CMPA. Cooperative programs and incentives will also be utilized to promote seamless landscape management that meets human needs and maintains and improves ecological and economic integrity. (See CHAPTER VII. C. Cooperation, Consultation, and Coordination for a list of SMAC positions.)

9. A Science Advisory Committee will advise the BLM and the SMAC on scientific issues concerning the Steens Mountain CMPA. The committee will be established and convened, when necessary, as determined by the SMAC and the BLM.

4 MANAGEMENT OPPORTUNITIES (RECOMMENDATIONS AND INTEGRATED PRIORITIES)

4.1 Introduction

Identification of potential management opportunities is step five in developing the AMS. Management opportunities are actions or management direction that could be taken to resolve the issues and concerns identified. Management opportunities include those that would maintain or enhance resources, increase or decrease production or use, and minimize depletion or improve conditions of resources managed by the BLM or other agencies. The management opportunities are the basis for action alternatives in the RMP/EIS.

Management opportunities and action alternatives must consider the land's capability to achieve the objectives. Land capability is the ability or potential of a land unit to produce resources, supply goods and services, or allow resource uses under a set of management practices without sustaining permanent damage. Capability usually depends on a fixed set of environmental conditions that are relatively stable over time. Most land has an inherent capability to produce one or more resources, or to allow resource uses, under natural conditions. Capability analysis allows the manager to identify specific uses or management practices that cannot be allowed on certain areas due to certain environmental conditions.

This section also serves as step four of the subbasin review process, which is to develop recommendations and determine integrated priorities. Management opportunities serve as the recommendations for the subbasin review area. For the BLM administered lands and resources considered in the subbasin review, priorities for the various management opportunities will be set during preparation of the RMP/EIS.

The ICBEMP scientific assessments identified a number of findings determined by BLM staff to be applicable to the Planning Area and to this planning effort (FS and BLM 1999). Those applicable findings will be addressed in the RMP/EIS.

4.2 Management Opportunities by Resource

The following sections identify management opportunities for resources in all or portions of the subbasin review area. These management opportunities include those resource areas that are specific to BLM administered land and those that are integral to a larger geographical region (air quality, water, wildlife).

4.2.1 Air Quality

With all authorized actions, meet or exceed the National Ambient Air Quality Standards and the Prevention of Significant Deteriorations.

4.2.2 Vegetation

Restore, protect, and enhance the diversity and distribution of desirable vegetation communities, including perennial native and desirable introduced plant species.

Provide for their continued existence and normal function in nutrient, water, and energy cycles.

Manage big sagebrush cover in seedings and on native rangelands to meet the life history requirements of sagebrush-dependent wildlife.

Control the introduction and proliferation of noxious weed species and reduce the extent and density of established weed species to within acceptable limits.

4.2.3 Special Status Plants

Manage public land to maintain, restore, or enhance populations and habitats of special status plant species. Priority for the application of management actions would be: (1) federal endangered species, (2) federal threatened species, (3) federal proposed species, (4) federal candidate species, (5) state listed species, (6) BLM sensitive species, (7) BLM assessment species, and (8) BLM tracking species.

Manage in order to conserve or lead to the recovery of threatened or endangered species.

4.2.4 Water Resources and Riparian/Wetlands

Ensure that surface water and groundwater influenced by BLM activities comply with or are making progress toward achieving State of Oregon water quality standards for beneficial uses as established per stream by the Oregon Department of Environmental Quality (ODEQ).

Restore, maintain, or improve riparian vegetation, habitat diversity, and associated watershed function to achieve healthy and productive riparian areas and wetlands.

Where water rights are needed to support programs and projects within the Planning Area, they will be secured through normal channels as prescribed by state law.

4.2.5 Fish and Aquatic Habitat

Restore, maintain, or improve habitat to provide for diverse and self-sustaining communities of fishes and other aquatic organisms.

4.2.6 Wildlife and Wildlife Habitat

Maintain, restore, or enhance riparian areas and wetlands so they provide diverse and healthy habitat conditions for wildlife.

Manage upland habitats so that the forage, water, cover, structure, and security necessary for wildlife are available on public land.

4.2.7 Special Status Animal Species

Manage public land to maintain, restore, or enhance populations and habitats of special status animal species. Priority for the application of management actions would be: (1) federal endangered species, (2) federal threatened species, (3) federal proposed species, (4) federal candidate species, (5) state listed species, (6) BLM sensitive species, (7) BLM assessment species, and (8) BLM tracking species.

Manage in order to conserve or lead to the recovery of threatened or endangered species.

Facilitate the maintenance, restoration, and enhancement of bighorn sheep populations and habitat on public land. Pursue management in accordance with Oregon's Bighorn Sheep Management Plan in a manner consistent with the principles of multiple-use management.

4.2.8 Wild Horses

Maintain and manage wild horse herds in established HMAs at AMLs to ensure or enhance a thriving natural ecological balance between wild horse populations, wildlife, livestock, vegetation resources, and other resource values.

Enhance and perpetuate special and unique characteristics that distinguish the respective herds.

An opportunity exists to combine the small Heath Creek/Sheepshead HMA with the adjacent larger more viable Sheepshead HMA (Vale District). The same opportunity exists to combine the Alvord Tule Springs HMA with the adjacent Coyote Lake HMA. Animals currently mix between the respective HMAs where there are unfenced areas or ineffective natural boundaries.

4.2.9 Grazing Management

Grazing will be in compliance with current policy, which includes the Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands in Oregon and Washington.

Provide for a sustained level of livestock grazing consistent with other resource objectives and public land use allocations.

Livestock grazing in the Planning Area will be managed under laws provided by the Taylor Grazing Act, Public Rangelands Improvement Act, national Environmental Policy Act, Wilderness Act, the Act, and BLM regulations. The RMP will include the Standards for Rangeland Health and Guidelines for grazing management, which apply to all BLM lands in Oregon.

The RMP will address several pasture and allotment boundary changes occurring as a result of land exchanges, forage offsets for creation of the "no-livestock grazing" area and grazing management changes.

4.2.10 Woodlands

Manage woodlands to maintain or restore ecosystems to a condition in which biodiversity is preserved and occurrences of fire, insects, and disease do not exceed levels normally expected in a healthy woodland.

Manage woodlands for long-term, healthy habitat for animal and plant species.

Restore productivity and biodiversity in juniper and aspen woodland areas.

Manage juniper areas where encroachment or increased density is threatening other resource values.

Retain old growth characteristics in historic juniper sites not prone to frequent fire.

Manage aspen to maintain diversity of age classes and to allow for species reestablishment.

4.2.11 Fire

Provide an AMR on all wildland fires with emphasis on fire fighter and public safety, benefits, minimizing

suppression costs, and protecting values consistent with resource objectives.

Recognize fire as a critical natural process and use it to protect, maintain, and enhance resources.

4.2.12 Special Management Areas

4.2.12.1 Areas of Critical Environmental Concern

Retain existing and designate new ACECs/RNAs where relevance and importance criteria are met and special management is required to protect the values identified.

4.2.12.2 Wild and Scenic Rivers

Protect and enhance ORVs of designated WSR and protect and enhance ORVs of rivers found suitable for WSR status until Congress acts.

4.2.13 Wilderness/Wilderness Study Areas

Designated Wilderness Areas will be managed under the Wilderness Management Policy, the Wilderness Act, and 43 CFR 6300. The wilderness resources will be dominant whenever choices must be made between preservation of the wilderness character and visitor use.

BLM administered land identified in the Wilderness Study Report and determined to have wilderness values could be included in adjacent WSAs and managed under IMP.

4.2.14 Recreation

Provide and enhance developed and undeveloped recreation opportunities and manage the increasing demand for resource-dependent recreation activities while protecting resources.

4.2.14.1 Off-Highway Vehicles

Manage OHV use to protect resource values, promote public safety, provide OHV use opportunities where appropriate, and minimize conflicts among various users.

4.2.15 Visual Resources

Manage public land actions and activities in a manner consistent with VRM class objectives.

4.2.16 Human Uses and Values

Manage public land and pursue partnerships to provide social and economic benefits to local residents, businesses, visitors, and for future generations.

4.2.17 Lands and Realty

Retain public land with high public resource values.

Consolidate public land holdings and acquire land or interests in land with high public resource values to ensure effective administration and improve resource management. Acquired land would be managed for its intended purpose.

Make public land available for disposal within Zone 3 by state indemnity selection, private or state exchange, Recreation and Public Purpose (R&PP) Act lease or sale, public sale, or other authorized method.

Establish utility and transportation system corridor routes consistent with resource objectives and considering avoidance areas.

4.2.18 Minerals

Provide opportunities for exploration and development of leasable energy and mineral resources while protecting other sensitive resources.

Provide opportunities for exploration and development of locatable mineral resources while protecting other sensitive resources.

Provide for public demand for saleable minerals from public land while protecting sensitive resources.

4.2.19 Cultural Resources

Protect and conserve cultural and paleontological resources.

Increase the public's knowledge, appreciation, and sensitivity regarding cultural and paleontological resources.

Consult and coordinate with American Indian groups to ensure consideration of their traditional religious sites, land forms, resources, and other interests.

4.3 Management Opportunities for the Cooperative Management and Protection Area

Manage the Steens Mountain CMPA to conserve, protect, and manage the long-term ecological integrity of Steens Mountain for present and future generations.

Maintain and enhance cooperative and innovative management projects, programs, and agreements between tribal, public, and private interests in the Steens Mountain CMPA.

Promote grazing, recreation, historic, and other sustainable uses.

Conserve, protect and ensure traditional access to cultural, gathering, religious, and archaeological sites on public land within the Steens Mountain CMPA by members of the Burns Paiute Tribe and promote cooperation with private landowners.

Ensure the conservation, protection, and improved management of the ecological, social, and economic environment of the Steens Mountain CMPA, including geological, biological, wildlife, riparian, and scenic resources.

Promote and foster cooperation, communication, and understanding in order to reduce conflict between Steens Mountain users and other interests.

Establish a monitoring program for public land within the Steens Mountain CMPA so that progress toward ecological integrity objectives can be determined.

5 LEGAL MANDATES, PLANNING CRITERIA AND PROPOSED ALTERNATIVES - ANDREWS MANAGEMENT UNIT/STEENS MOUNTAIN CMPA RMP/EIS

5.1 Introduction

This section briefly describes the legal authorities pertaining to BLM land use planning, the planning criteria to be used in preparing the Andrews MU/Steens Mountain CMPA RMP/EIS, and the proposed alternatives to be addressed in the RMP/EIS.

Principles of ecosystem management, as well as a continuing commitment to multiple-use and sustained yield, will guide land use decisions in the Planning Area. The commitment to multiple-use will not mean that all land will be open for all uses. Some uses may be excluded on some land to protect specific resource values or uses. Any such exclusion, however, will be based on laws or regulations or determined through a planning process subject to public involvement.

The NEPA requires an EIS to examine a range of alternatives, including a No Action Alternative, to resolve the issues in question. Each alternative, except the No Action Alternative, should represent a complete but alternate means of satisfying the identified purpose and need of the EIS, as well as resolving the issues. New alternatives may be developed and defined as needed during the preparation of the EIS. A range of preliminary alternatives has been identified for this RMP/EIS. These will be refined as the process moves forward.

5.2 Legal Authorities

Several federal statutes have been enacted over time to establish and define the authority of the BLM to make decisions regarding management and use of public land resources. Following is a list of major legal authorities relevant to BLM land use planning.

1. The Federal Land Policy and Management Act of 1976 (FLPMA), as amended, 43 U.S.C. 1701 *et seq.*, provides the authority for BLM land use planning.

a. Sec. 102(a)(7) and (8) sets forth the policy of the United States concerning the management of BLM lands.

b. Sec. 201 requires the Secretary of the Interior to prepare and maintain an inventory of all BLM lands and their resource and other values, giving priority to areas of critical environmental concern (ACECs); and, as funding and workforce are available, to determine the boundaries of the public lands, provide signs and maps to the public, and provide inventory data to state and local governments.

c. Sec. 202 (a) requires the Secretary, with public involvement, to develop, maintain, and when appropriate, revise land use plans that provide by tracts or areas for the use of the BLM lands.

d. Sec. 202 (c) (9) requires that land use plans for BLM lands be consistent with tribal plans and, to the maximum extent consistent with applicable federal laws, with state and local plans.

e. Sec. 202 (d) provides that all public lands, regardless of classification, are subject to inclusion in land use plans, and that the Secretary may modify or terminate classifications consistent with land use plans.

f. Sec. 202 (f) and Sec. 309 (e) provide that federal, state, and local governments and the public be given adequate notice and an opportunity to comment on the formulation of standards and criteria for, and to participate in, the preparation and execution of plans and programs for the management of the public lands.

g. Sec. 302 (a) requires the Secretary to manage the BLM lands under the principles of multiple use and sustained yield, in accordance with, when available, land use plans developed under Sec. 202 of FLPMA, except that where a tract of BLM lands has been dedicated to specific uses according to any other provisions of law, it shall be managed in accordance with such laws.

h. Sec. 302 (b) recognizes the entry and development rights of mining claimants, while directing the Secretary to prevent unnecessary or undue degradation of the public lands.

2. The National Environment Policy Act of 1969 (NEPA), as amended, 42 U.S.C. 4321 *et seq*., requires the consideration and public availability of information regarding the environmental impacts of major federal actions significantly affecting the quality of the human environment. This includes the consideration of alternatives and mitigation of impacts.

3. The Clean Air Act of 1990, as amended, 42 U.S.C. 7418, requires federal agencies to comply with all federal, state, and local requirements regarding the control and abatement of air pollution. This includes abiding by the requirements of State Implementation Plans.

4. The Clean Water Act of 1987, as amended, 33 U.S.C. 1251, establishes objectives to restore and maintain the chemical, physical, and biological integrity of the Nation's water.

5. The Federal Water Pollution Control Act, 33 U.S.C. 1323, requires the federal land manager to comply with all federal, state, and local requirements, administrative authority, process, and sanctions regarding the control and abatement of water pollution in the same manner and to the same extent as any non-governmental entity.

6. The Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755) as amended by: Chapter 634; June 20, 1936; 49 Stat. 1556; P.L. 86-732; September 8, 1960; 74 Stat. 866; P.L. 90-578; October 17, 1968; 82 Stat. 1118; P.L. 91-135; December 5, 1969; 83 Stat. 282; P.L. 93-300; June 1, 1974; 88 Stat. 190; P.L. 95-616; November 8, 1978; 92 Stat. 3111; P.L. 99-645; November 10, 1986; 100 Stat. 3590 and P.L. 105-312; October 30, 1998; 112 Stat. 2956.The original 1918 statute implemented the 1916 Convention between the U.S. and Great Britain (for Canada) for the protection of migratory birds. Later amendments implemented treaties between the U. S. and Mexico, the U.S. and Japan, and the U.S. and the Soviet Union (now Russia).

7. The Safe Drinking Water Act, 42 U.S.C. 201, is designed to make the Nation's waters "drinkable" as well as "swimmable." Amendments in 1996 establish a direct connection between safe drinking water and watershed protection and management.

8. The Endangered Species Act (ESA) of 1973, as amended, 16 U.S.C. 1531 *et seq*.:
   a. Provides a means whereby the ecosystems upon which endangered and threatened species depend may be conserved and to provide a program for the conservation of such endangered and threatened species (Sec. 1531 (b), Purposes).
   b. Requires all federal agencies to seek to conserve endangered and threatened species and utilize applicable authorities in furtherance of the purposes of the ESA (Sec. 1531 (c) (1), Policy).
   c. Requires all federal agencies to avoid jeopardizing the continued existence of any species that is listed or proposed for listing as threatened or endangered or destroying or adversely modifying its designated or proposed critical habitat (Sec. 1536 (a), Interagency Cooperation).
   d. Requires all federal agencies to consult (or confer) in accordance with Sec. 7 of the ESA, with the Secretary of the Interior, through the Fish and Wildlife Service and/or the National Marine Fisheries Service, to ensure that any federal action (including land use plans) or activity is not likely to jeopardize the continued existence of any species listed or proposed to be listed under the provisions of the ESA, or result in the destruction or adverse modification of designated or proposed critical habitat (Sec. 1536 (a), Interagency Cooperation, and 50 CFR 402).

9. The Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271 *et seq*., requires the federal land management agencies to identify potential river systems and then study them for potential designation as wild, scenic, or recreational rivers.

10. The Wilderness Act, as amended, 16 U.S.C. 1131 *et seq*., authorizes the President to make recommendations to the Congress for federal lands to be set aside for preservation as wilderness.

11. The Antiquities Act of 1906, 16 U.S.C. 431-433, protects cultural resources on federal lands and authorizes the President to designate National Monuments on federal lands.

12. The National Historic Preservation Act (NHPA), as amended, 16 U.S.C. 470, expands protection of historic and archaeological properties to include those of national, state, and local significance and directs federal agencies to consider the effects of proposed actions on properties eligible for or included in the National Register of Historic Places.

13. The American Indian Religious Freedom Act of 1978, 42 U.S.C. 1996, establishes a national policy to protect and preserve the right of American Indians to exercise traditional Indian religious beliefs or practices.

14. The Recreation and Public Purposes Act of 1926, as amended, 43 U.S.C. 869 *et seq*., authorizes the Secretary of the Interior to lease or convey BLM lands for recreational and public purposes under specified conditions.

15. The Federal Coal Leasing Amendments Act of 1976, 30 U.S.C. 201 (a)(3)(A)(i), requires that coal leases be issued in conformance with a comprehensive land use plan.

16. The Surface Mining Control and Reclamation Act of 1977, 30 U.S.C. 1201 *et seq*., requires application of unsuitability criteria prior to coal leasing and also to proposed mining operations for minerals or mineral materials other than coal.

17. The Mineral Leasing Act of 1920, as amended, 30 U.S.C. 181 *et seq*., authorizes the development and conservation of oil and gas resources.

18. The Onshore Oil and Gas Leasing Reform Act of 1987, 30 U.S.C. 181 *et seq*., provides:
    a. Potential oil and gas resources be adequately addressed in planning documents;
    b. The social, economic, and environmental consequences of exploration and development of oil and gas resources be determined; and
    c. Any stipulations to be applied to oil and gas leases be clearly identified.

19. The General Mining Law of 1872, as amended, 30 U.S.C. 21 *et seq*., allows the location, use, and patenting of mining claims on sites on public domain lands of the United States.

20. The Mining and Mineral Policy Act of 1970, 30 U.S.C. 21a, establishes a policy of fostering development of economically stable mining and minerals industries, their orderly and economic development, and studying methods for disposal of waste and reclamation.

21. The Taylor Grazing Act of 1934, 43 U.S.C. 315, "[T]he Secretary of the Interior is authorized, in his discretion, by order to establish grazing districts or additions thereto...of vacant unappropriated and unreserved lands from any part of the public domain...which in his opinion are chiefly valuable for grazing and raising forage crops[.]..." The Act also provides for the classification of lands for particular uses.

22. The Public Rangelands Improvement Act of 1978, 43 U.S.C. 1901, provides that the public rangelands be managed so that they become as productive as feasible in accordance with management objectives and the land use planning process established pursuant to 43 U.S.C. 1712.

23. Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations), 49 *Fed. Reg*. 7629 (1994), requires that each federal agency consider the impacts of its programs on minority populations and low income populations.

24. Executive Order 13007 (Indian Sacred Sites), 61 *Fed. Reg*. 26771 (1996), requires federal agencies to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions, to:
    a. Accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners; and
    b. Avoid adversely affecting the physical integrity of such sacred sites.

25. Executive Order 13084 (consultation and Coordination with Indian Tribal Governments) provides, in part, that each federal agency

shall establish regular and meaningful consultation and collaboration with Indian tribal governments in the development of regulatory practices on federal matters that significantly or uniquely affect their communities.

26. Executive Order 13112 (Invasive Species) provides that no federal agency shall authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk or harm will be taken in conjunction with the actions.

27. Executive Order 13186 of January 10, 2001 (responsibilities of federal agencies to protect Migratory Birds) *66 Fed. Reg. 3853* (2001), provides the furtherance of the purposes of the migratory bird conventions, the Migratory Bird Treaty Act (16 U.S.C. 703-711), the Bald and Golden Eagle Protection Acts (16 U.S.C. 668-668d), the Fish and Wildlife Coordination Act (16 U.S.C. 661-666c), the ESA of 1973 (16 U.S.C. 1531-1544), the National Environmental Policy Act of 1969 (42 U.S.C. 4321-4347), and other pertinent statutes.

28. Secretarial Order 3175 (incorporated into the Departmental manual at 512 DM 2) requires that if Department of the Interior (DOI) agency actions might impact Indian trust resources, the agency explicitly address those potential impacts in planning and decision documents, and the agency consult with the tribal government whose trust resources are potentially affected by the federal action.

29. Secretarial Order 3206 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the ESA) requires DOI agencies to consult with Indian Tribes when agency actions to protect a listed species, as a result of compliance with ESA, affect or may affect of Indian lands, tribal trust resources, or the exercise of American Indian tribal rights.

An additional legal authority specific to the Andrews MU/Steens Mountain RMP/EIS is as follows:

30. The Steens Mountain Cooperative Management and Protection Act of 2000, P.L. 106-399, October 30, 2000, establishes the Steens Mountain Wilderness Area, the Steens Mountain Cooperative Management and Protection Area, the Redband Trout Reserve and the Wildland Juniper Management Area and designates additional components of the National Wild and Scenic Rivers System. This act requires the Burns BLM District to:

- maintain the cultural, economic, ecological, and social health of the Steens Mountain Area in Harney County, Oregon,
- acquire private lands through exchange for inclusion in the Steens Mountain Wilderness and the Steens Mountain CMPA,
- provide for and expand cooperative management activities between public and private landowners in the vicinity of the Steens Mountain Wilderness and surrounding lands,
- authorize the purchase of land as well as development and non-development rights,
- establish a citizens' management advisory council for the Steens Mountain CMPA,
- maintain and enhance cooperative and innovative management practices between the public and private land managers in the Steens Mountain CMPA,
- promote viable and sustainable grazing and recreation operations on private and public lands,
- conserve, protect, and manage for healthy watersheds and long-term ecological integrity of Steens Mountain, and
- authorize only such uses on federal lands in the Steens Mountain CMPA as are consistent with the purposes of the Act.

5.3 Planning Criteria

BLM planning regulations (43 Code of Federal Regulations 1610) require preparation of planning criteria for all RMPs. Planning criteria are the constraints or ground rules guiding and directing the development of the Plan. They determine how the planning team and the public approach the development of alternatives and ultimately the selection of a Preferred Alternative. Criteria ensure that plans are tailored to the identified issues, and that unnecessary data collection and analyses are avoided. Planning criteria are based on analyses of information pertinent to the Planning Area; professional judgment; standards prescribed by applicable laws, regulations, and agency guidance; and are the result of consultation and

coordination with the public, other federal, state, and local agencies, and Indian tribes.

The preliminary criteria listed below were developed by the BLM and will be reviewed by the public before being used in the RMP process. The criteria will be included in a Federal Register Notice along with notification of public scoping meetings. After public input, criteria become proposed criteria and can be added to or changed as issues are addressed or new information is presented. The Burns District Manager will approve the issues, criteria, and any changes.

5.3.1 General Planning Criteria

The following general planning criteria will guide the preparation of the RMP/EIS and future land-use decisions.

- The RMP/EIS will be completed in compliance with FLPMA and all other applicable laws.
- The planning team will work cooperatively with the state, SMAC, RAC, tribal governments, county and municipal governments, other federal agencies, and all other interested groups, agencies, and individuals. Public participation will be encouraged throughout the process.
- The RMP/EIS will establish the guidance upon which the BLM will rely in managing the Planning Area.
- The planning process will include an EIS that complies with NEPA standards.
- The RMP/EIS will emphasize the protection and enhancement of the Planning Area's biodiversity while at the same time providing the public with opportunities for compatible commodity-based and recreation activities.
- The RMP/EIS will recognize valid existing rights within the Planning Area and review how such rights are verified. The Plan will outline the process used by the BLM to address applications or notices filed on existing claims or other land use authorizations after completion of the Plan.
- The lifestyles and concerns of area residents, including the activities of grazing, fishing, and hunting, will be recognized in the Plan.
- Any land within the Planning Area's administrative boundary and subsequently acquired by the BLM will be managed consistent with the Plan, subject to any constraints associated with the acquisition.
- The RMP/EIS will recognize the state's responsibility to manage wildlife. The BLM would consult with the ODFW before establishing no-hunting zones or periods for the purposes of protecting public safety, administration, or public use and enjoyment. Methods of access and the manner in which wildlife management activities are to be conducted will be governed by the BLM, consistent with language in the Act.
- The RMP/EIS will address transportation and access, and will identify where better access is warranted, where it should remain as is, and where decreased access is appropriate to protect Planning Area resources and manage visitation.
- The management of grazing is regulated by laws and regulations. The RMP/EIS will incorporate the Rangeland Health Standards and Guidelines. It will define a strategy for ensuring that proper grazing practices are followed within the Planning Area.
- The planning process will involve American Indian tribal governments and will provide possible strategies to protect recognized traditional uses, if such uses are identified.
- Consistent with federal law and the Act, decisions in the RMP/EIS will strive to be compatible with existing plans and policies of adjacent local, state, federal, and tribal agencies.
- In addition to the general criteria listed above, specific criteria apply to the Steens Mountain CMPA.

The RMP/EIS will meet the following specific requirements of the Act:

a. Protect the Steens Mountain CMPA's natural resources and outstanding recreation opportunities, while encouraging cooperative management;

b. Describe appropriate uses and management of the Steens Mountain CMPA consistent with the Act;

c. Incorporate, as appropriate, decisions contained in any current or future management or activity plan for the Steens Mountain CMPA; use information developed in previous studies of the land within or adjacent to the Steens Mountain CMPA;

d. Coordinate with state, county, and private landowners and the Burns Paiute Tribe; and

e. Determine measurable and achievable management objectives consistent with the Act to ensure the ecological integrity of the area.

5.3.2 Project Specific Criteria

In addition to the general planning criteria identified above, other specific planning criteria have been developed and apply to the RMP/EIS.

5.3.2.1 Air Quality

Under the Clean Air Act, air quality of the Planning Area is designated as Class II. All land will be managed under Class II standards unless reclassified by the State of Oregon.

5.3.2.2 Water Quality

The Federal Water Pollution Control Act of 1977 as amended (Clean Water Act) requires the BLM to be consistent with state nonpoint source management program plans and relevant water quality standards. Section 313 requires compliance with state water quality standards. The RMP/EIS will incorporate Best Management Practices (BMPs) or other conservation measures for specific programs and activities. Water quality will be maintained or improved in accordance with state and federal standards. In addition, Total Maximum Daily Loads (TMDLs) will be developed pursuant to the Clean Water Act that address water quality limited stream segments. The TMDLs are being developed cooperatively between the BLM and the ODEQ.

5.3.2.3 Soil

Soil will be managed to protect long-term productivity. BMPs will be incorporated into other programs to minimize soil erosion and compaction resulting from management actions.

5.3.2.4 Vegetation

Vegetation will be managed to provide for biological diversity at the landscape level, to protect and restore native perennial and desirable nonnative perennial species, and to provide for consumptive uses and non-consumptive values, including visual quality and watershed condition. Livestock forage allocations established in the Andrews MU grazing program EIS and subsequent agreements and decisions, will not be revised by this plan.

Grazing management adjustments will occur on a priority basis over the life of the plan through the adaptive management process and subsequent agreements, decisions, or activity plan revisions. Authorization of livestock use in the Planning Area will be subject to change through the life of the plan. The RMP/EIS will include provisions for plant maintenance, watershed protection and stability, wildlife habitat, as well as for livestock and wild horses. Fire and other treatment methods are considered tools to meet vegetation management objectives.

5.3.2.5 Riparian Areas, Floodplains, and Wetlands

Riparian areas, floodplains, and wetlands will be managed to restore, protect or improve their natural functions relating to water storage, ground water recharge, water quality, and fish and wildlife values.

5.3.2.6 Woodlands

All juniper and quaking aspen woodlands will be managed to protect long-term biological productivity and diversity and watershed values.

5.3.2.7 Noxious Weed Control

The BLM will work with county, state, and federal agencies to monitor the locations and spread of noxious weeds. Noxious weed control will be conducted in accordance with the integrated weed management guidelines and design features identified in the Burns District Noxious Weed Management Program. The BLM will assess land prior to acquisition to determine if noxious weeds are present.

5.3.2.8 Special Status Species

The BLM is mandated by law to assist in the conservation and recovery of species listed as Threatened or Endangered or proposed for listing under the ESA. Federal actions that may affect the well-being of these species require consultation with the USFWS. BLM policy requires that authorized actions do not contribute to the need to list any other special status species under the provisions of the ESA. The intent is to avoid the need for future listings of species as threatened or endangered.

5.3.2.9 Wild Horses

Forage will be provided to support wild horse populations at levels established in accordance with the Wild Free-Roaming Horse and Burro Act. Adjustments

in range allocation will be based on monitoring to ensure a thriving natural ecological balance within HMAs.

5.3.2.10 Grazing Management

Grazing of public land will be authorized under the principles of multiple-use and sustained yield. Livestock will be managed to maintain or improve public land resources and rangeland productivity and to stabilize the livestock industry dependent on the public range over the long term. Forage will be allocated by allotment for livestock grazing on suitable rangeland based on multiple-use and sustained yield objectives. Existing management systems, including those outlined in AMPs, will continue until evaluations indicate that change is needed to meet objectives.

The process for determining livestock forage allocations through allotment evaluations will proceed in accordance with BLM regulations and policy.

5.3.2.11 Fire Management

Wildland fire will be integrated into land and resource management planning to help achieve resource management objectives. The use of surface-disturbing equipment to suppress wildland fires will be restricted in Steens Mountain Wilderness, WSAs, and areas containing significant cultural or paleontological values, except when needed to protect human life or property. Public land affected by fire will be managed in accordance with multiple-use objectives.

5.3.2.12 Land Tenure Adjustments

BLM administered land will be retained in public ownership unless disposal of a particular parcel will serve the public interest. Land may be identified for disposal by sale, exchange, state indemnity selection or other authorized methods. Land will be identified for acquisition based on public benefits, management considerations, and public access needs. Specific actions meeting land tenure adjustment criteria as established in the RMP/EIS will occur with public participation and will be made in consultation with local, county, state, and tribal governments.

5.3.2.13 Rights-of-Way and Land Use Authorizations

Public land will generally be available for land use authorizations including transportation and utility ROWs with preference given to existing corridors. Exceptions will include areas specifically prohibited by law or regulation (e.g., wilderness) and specific areas identified to protect resource values.

5.3.2.14 Energy and Minerals

Except where specifically withdrawn, public land will be available for energy and mineral exploration and development, subject to applicable federal and state laws and regulations.

5.3.2.15 Recreation

All public land will be within Special Recreation Management Areas or Extensive Recreation Management Areas. Some areas may be subject to special measures to protect resources or reduce conflicts among uses. Where there is a demonstrated need, the BLM may develop and maintain recreation facilities including campgrounds, picnic areas, interpretive sites, boat access, and trails.

5.3.2.16 Off Highway Vehicles

All public land will be designated as open, limited or closed for OHV use. Public safety, resource protection, user access needs, and conflict resolution will be considered in assigning these designations.

5.3.2.17 Visual Resources

The BLM will manage public land to protect the quality of scenic (visual) values in accordance with established guidelines. All public land will be designated as VRM Class I, II, III or IV.

5.3.2.18 Wild and Scenic Rivers

As required by law, streams will be evaluated for addition to WSRs. The evaluation will be conducted according to BLM Manual Section 8351 - Wild and Scenic Rivers - Policy and Program Direction for Identification, Evaluation and Management. Designated WSRs will be managed in accordance with laws and existing plans.

5.3.2.19 Wilderness and Wilderness Study Areas

Wilderness will be managed according to the Wilderness Act and wilderness regulations. WSAs designated under authority of FLPMA, Sections 603 and 202, will be managed in accordance with the BLM IMP for lands under wilderness review. This planning effort will not reopen the initial wilderness review mandated by Section 603 of FLPMA, and it will not change existing decisions, signed by the Secretary of the Interior, to recommend areas as suitable for wilderness designation. New areas could be inventoried for wilderness characteristics during the planning process. Any new wilderness inventories and studies

will be conducted under the authority of Sections 201 and 202 of FLPMA.

5.3.2.20 Cultural and Paleontological Resources

Cultural and paleontological resources will be managed to maintain or enhance scientific, interpretive, and educational values. Cultural resources will be managed to protect American Indian interests where possible.

5.3.2.21 Areas of Critical Environmental Concern

ACECs will be designated where special management attention is required to protect historical, cultural, or scenic values; natural resources or processes; or human life and safety. Management requirements for ACECs will be identified in the RMP/EIS.

5.3.3 Planning Criteria for Selecting an Alternative

In selecting the preferred alternative in the resource management plan, the BLM will consider:

- Achievement of management goals and issue resolution;
- Discretionary limits of applicable laws, regulations, and agency policies;
- Options for reasonable, feasible, and practical management of public lands and resources; and
- Adequacy for a complete land use plan.

5.4 Alternative Formulations

A range of alternatives, including a No Action Alternative, will be developed to address issues identified initially and from public scoping. Each alternative will provide different solutions to the issues and concerns. The objective in alternative formulation will be to develop realistic solutions. Some subalternatives may be identified where only parts of an alternative require variations in possible resource management. Due to the mandates of the Act, the Steens Mountain CMPA and the Andrews MU may require differing alternative formulations.

Preliminary alternatives to be formulated for the Plan include the following:

5.4.1 Alternative A

This Alternative would continue the present management strategies while meeting the legislative requirements for the RMP as mandated by P.L. 106-399 and other laws and regulations. (The No Action Alternative is not viable for mandates of the Act.) This alternative continues implementation of the Andrews MFP and incorporates the decisions in the Andrews Grazing Management EIS and Rangeland Program Summary as well as all decisions subsequent to the MFP.

5.4.2 Alternative B

This Alternative would maximize the enhancement and protection of the Planning Area's natural, cultural, scenic, and wilderness resources, and would emphasize natural values and the functioning of natural systems. Commodity production would be substantially constrained to protect sensitive resources or accelerate improvement in their condition.

5.4.3 Alternative C

This Alternative would maximize commodity production opportunities available in the Planning Area while providing the legally required protection for the Area's SMAs and other natural resources. Restraint on commodity production to protect sensitive resources would be minimally restrictive within the limits defined by law, regulation, and BLM policy. Potential impacts to sensitive resource values would be mitigated on a case-by-case basis.

5.4.4 Alternative D

This Alternative would balance natural resource protection and commodity production required by public land users. Constraints on commodity production would be implemented to protect sensitive resources, but would not be as minimal as in Alternative C or as stringent as in Alternative B.

6 SUBBASIN REVIEW REPORT

6.1 Introduction

"The Interior Columbia Basin Ecosystem Management Project (ICBEMP) was established in 1994...to develop and then adopt a scientifically sound ecosystem based strategy for managing all USFS or BLM administered lands within the (Interior Columbia) Basin." (Status of the Interior Columbia Basin, Summary of Scientific Findings [USFS 1996]). The ICBEMP covered an area of 145 million acres, 53 percent of which is public land managed by the BLM or the USFS. The size of this area requires some means to bring findings and information down to a level where they can be applied in a USFS or BLM management unit such as a ranger district or resource area. A process was developed with which the pertinent information could be "stepped down" to the local management level. This is called the subbasin review process.

The ICBEMP area was divided for analysis and review purposes into four geographic scales: broad-scale (Interior Columbia Basin), mid-scale (subbasins or groups of subbasins), fine-scale (watershed), and site scale (project). The mid-scale or subbasin level is the level at which field offices would undertake long range planning for all resources within their respective administrative boundaries. The subbasins are based on the US Geological Survey 4th field hydrologic unit codes (HUCs). On average these 4th field HUCs comprise an area of 500,000 to 1,000,000 acres. The Planning Area subbasin review area included six subbasins identified in the ICBEMP scientific assessment: Guano, Harney/Malheur Lakes, Alvord Lake, Donner und Blitzen, Thousand-Virgin, and Crooked-Rattlesnake comprising an area of approximately 6,200,110 million acres. Land ownership and administrative responsibilities included private, county, State of Oregon, BLM, and USFWS. The majority of the land in the Planning Area portion of the subbasin review area is administered by the BLM, Burns DO (Figure 2.9). Only those portions of the subbasins in the Planning Area are described.

In anticipation of preparing a comprehensive RMP/EIS, the Burns DO collected a considerable amount of data and information about the resources on BLM administered lands. Much of this information was in GIS format. Data and information needed for the resources in the subbasin review area and from other agencies were identified prior to preparation of the AMS/subbasin review.

A BLM team was assembled to be the core group responsible for gathering data and putting it into a written or GIS format. This team was comprised of a planning/NEPA specialist, a wildlife biologist, a fisheries biologist, a botanist, a recreation specialist, a wilderness specialist, a GIS specialist and a management support specialist. This core group is also part of a larger Inter Disciplinary (ID) team comprised of many other resource specialists and representatives for cooperating agencies. The subbasin review team would deal primarily with health-of-the-land issues.

6.2 Issues and Findings

Broad-scale information from the ICBEMP provides a general characterization of the Planning Area subbasin review area relative to the rest of the Interior Columbia Basin. The broad-scale information indicates that essentially 100 percent of this subbasin review area is rangeland. Rangeland in the subbasin review area is classified as low integrity. The rangeland is described as being dominated by dry shrubland vegetation that is highly sensitive to overgrazing and susceptible to invasion by noxious weeds. Hydrologic integrity is low to moderate and the integrity of riparian environments is commonly low. Some native fish species occur in highly fragmented habitat.

The conditions described above significantly increase the subbasins' susceptibility to wildland fire, insects and disease, soil erosion, loss of native species, and other problems that threaten ecological integrity, water quality, species recovery, timber and forage production, and other uses of public lands (Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin, USFS, BLM 1996).

The following potential issues were identified by the Burns DO prior to the beginning of the subbasin review process. These will be addressed in the RMP/EIS, pending any changes.

1) How will the BLM manage resource uses to improve and maintain the integrity of upland ecological communities?

- How will livestock grazing be managed to sustain resource values while maintaining stable watersheds and the continued production of forage?
- What areas previously ungrazed could be grazed and under what circumstances? Are there areas where, or situations when, grazing should be excluded?
- What practices will be authorized and implemented to provide wildlife habitat and

forage for livestock while maintaining other uses and values of public land resources?

- Under what conditions is grazing compatible with management of SMAs such as WSAs, WSRs, and ACECs?
- What are the visual considerations relating to upland conditions, and how will the BLM's Visual Resource Management (VRM) play a role?
- What indicators will be used to identify levels of wild horse use compatible with sustaining a thriving, natural, ecological balance?
- What practices will the BLM implement to manage wild horses consistent with the legislative mandate that all management activities be at minimum feasible level?
- What practices will be authorized and implemented to provide adequate habitat and forage for wildlife while maintaining other resource uses and values?
- What grazing practices are necessary to protect sensitive resource values such as riparian areas and special status species?
- What new and existing rangeland projects, including seedings, are needed to improve rangeland resource values?
- What rehabilitation practices will be implemented following rangeland project construction and maintenance that disturbs established vegetation cover?
- What criteria should be considered for fire rehabilitation, for restoration of wildlife habitat, and to determine whether or not native or introduced species should be seeded to stabilize watersheds?
- How should the BLM prioritize implementation of management practices to maintain desired conditions and improve undesirable conditions where feasible?
- What criteria should be established to determine conditions and timetables for improvements?
- What resource uses and management practices will be employed in geographic areas with lower management priority?
- Is the current strategy of full wildland fire suppression compatible with upland management objectives?
- How, and to what extent, should fire be used to manage western juniper and aspen woodlands?
- Can cottonwood stands be restored along Donner und Blitzen WSR and the east side of Steens Mountain?
- Can juniper treatments in corridors be accomplished?

2) How will the BLM manage resource uses to improve or maintain the integrity of riparian ecological communities?

- How will riparian vegetation communities be managed to improve or maintain ecological condition, species diversity, bank stability, water quality, and the timing of watershed discharge while providing for resource uses such as grazing, recreation, water development, mineral exploration and development, and woodland products harvest?
- What areas previously excluded from grazing could be grazed and under what circumstances? Are there areas or situations when grazing should be excluded?
- What are the visual considerations relating to riparian conditions, and how will the BLM's VRM play a role?
- How will riparian systems be managed to improve or maintain habitat quality for fish, wildlife, plants, and invertebrates?
- How will riparian and wetland areas be managed to incorporate State of Oregon water quality standards and approved management plans addressing water quality concerns?
- Is the current strategy of full wildland fire suppression compatible with riparian management objectives?
- How will management actions in upland communities be handled to be compatible with the needs of riparian communities?
- How should management actions with potential to affect riparian communities be identified and prioritized?
- What timeframes are acceptable to achieve riparian management objectives?
- When does the establishment of juniper threaten other resource values, and what management actions can be used to control the invasion?
- Is collection of baseline riparian information and PFC on acquired and isolated stream segments necessary?
- Should the riparian habitat inventory be redone?

3) How will the BLM maintain or improve woodland communities and how will woodlands be managed to maintain or improve rangeland and wildlife habitat?

- What should be done to preserve and manage the 20.1 acres of grand fir forested areas on public land on Steens Mountain?

- Are there juniper woodland areas that should be preserved?
- What types of woodland products should be harvested?
- What are the potential effects of woodland management on wildlife, watersheds, soils, vegetation, recreation, aesthetics, and other resources?
- What kind of woodland management is compatible with management of Wilderness, ACECs, WSRs, and other SMAs?

4) How will the BLM provide for wildlife habitat while considering other resource uses?

- To what extent will livestock management and brush control be conducted to meet the habitat requirements of wildlife?
- Which areas, if any, are appropriate for reintroduction of wildlife, and what species could be reintroduced?
- What management practices avoid conflicts between wildlife and livestock for vegetation, especially between bighorn sheep and domestic sheep?
- What are the long-term strategies for managing wildlife?
- To what extent will the BLM adopt ODFW management objectives for game and nongame species of wildlife?
- What management practices best address areas of biodiversity, the needs of species at the limits of their range, and species assemblages?

5) How can public land management contribute to the preservation of and increase in healthy, sustainable populations of species now considered in Special status? How can land management successfully prevent habitat destruction which would lead to listing of additional species?

- To what extent will livestock management and brush control be conducted to meet the habitat requirements of Special status species?
- Which areas, if any, are appropriate for reintroduction of Special status species?
- What are the long-term strategies for managing habitat for Special status species?
- To what extent will the BLM adopt ODFW management objectives for Special status species?
- What management practices best address areas of biodiversity, the needs of Special status species at the limits of their range, and species assemblages?

6) How will BLM manage energy and mineral resources on public land?

- Are there areas where some types of energy and mineral development should be restricted or prohibited?
- Are there areas where mineral development should be recognized as being the highest and best use?
- How will energy and mineral development be managed to minimize resource conflicts?
- What are the visual considerations relating to management of energy and mineral resources, and how will the BLM's VRM play a role?
- How should recreational rock collecting be managed?
- What reclamation practices will be implemented following mineral development activities?
- Which remediation methods should be used for each identified abandoned mine site?
- What leasing stipulations will be applied to the area outside of the mineral withdrawal?

7) How will SMAs be managed within the Steens Mountain CMPA and in the Andrews MU?

- Should existing ACECs be retained under their current designations and management prescriptions?
- Are there other areas that warrant special designations to protect unique or special values?
- Would designating new SMAs or eliminating existing SMAs affect other resource values or management?
- How will impacts from nonconforming but acceptable uses and administrative needs in the Wilderness Area be managed in order to meet objectives but also preserve wilderness character?
- How will wilderness values be protected against the impacts of unauthorized uses such as OHV use and other mechanized or motorized transport?
- What management actions are needed to protect and preserve wilderness values while offering opportunities for quality recreational experiences?
- Where and under what conditions will access be permitted to provide reasonable use and enjoyment of private land within wilderness?

- How will WSRs be managed as they relate to wilderness or other SMAs?
- How will the Historic District be managed with the continuing interest and visitation from the public?
- What preventive measures will need to be in place to successfully manage the No Livestock Grazing Area?
- How will the removal of livestock from the No Livestock Grazing Area affect natural ecological processes?
- What management actions will be introduced to control the spread of western juniper and rejuvenate depleted aspen stands in the WJMA?
- How will the RTR be managed to protect the habitat for the fish and provide for research and education opportunities?
- How will land acquired subsequent to the Oregon Wilderness Inventory/EIS, and determined to contain wilderness characteristics, be managed?

8) How should the BLM manage wildland fire, fuels, and prescribed fire to meet and be consistent with resource objectives, while protecting life and property? How can BLM and private landowners work together to manage wildland fires?

- While the BLM continues to protect life, property, and important resources from fire, are there areas where Appropriate Management Response strategies should be implemented? If so, where and under what conditions would these strategies be applied?
- Which areas are appropriate for using prescribed/wildland fire as a management tool? How would this tool be used?
- Which areas may be subject to constraints (e.g., ODEQ air quality standards) that could limit the use of prescribed fire?
- Which areas should continue to have full suppression to protect important values?
- What rehabilitation practices would be implemented following fire?

9) How should the BLM manage recreation opportunities for both developed and dispersed recreation uses while meeting other resource objectives?

- What types and levels of recreation should the Planning Area provide?
- How, when, and to what extent should the BLM enhance recreation opportunities?
- What conflicts with resource values or other uses would restrict recreation opportunities?
- How should the BLM address Special Recreation Permits and any needed allocations?
- Would changes in existing OHV designations affect recreation opportunities?
- To what extent should the BLM develop facilities (campgrounds, trails, etc.) and generally improve recreation access opportunities to meet public demand, to provide for public health and safety, and to direct use away from areas of conflict?
- What role, if any, should the BLM serve in encouraging tourism?
- How should the BLM provide for public awareness of recreation resources and opportunities?

10) How should the BLM administer land status and values to improve management efficiency and cooperation with private landowners?

- Should some BLM administered land in the Planning Area be exchanged for other land with high public value if the exchange is consistent with the land tenure objectives of the BLM? If so, which land should be exchanged?
- What effect does the Oregon Division of State Land's (ODSL's) "Asset Management Strategy" have on management of public land?
- Should some federal agency withdrawals be considered for revocation?
- What land should be returned to BLM administration?
- Should state or other non-federal mineral estates under public surface ownership be acquired through mineral estate exchanges?
- Where should the BLM consider exchanging BLM administered land for other land with higher public values or consider selling isolated or difficult-to-manage land? Should the BLM consider selling land for public purposes and community expansion?
- What areas within the Planning Area should be identified as unsuitable for rights-of-way routes for major utilities and roads?
- What areas within the Planning Area should be identified as open for ROWs or other land use authorizations?
- What mitigation measures would be appropriate for land that is suitable for rights-of-way routes?

- Which land in the Planning Area should have current withdrawals or classifications revoked, continued or modified? Which land in the Planning Area not currently withdrawn should be withdrawn in order to protect Planning Area resources?
- Where should utility corridors, avoidance, and exclusion areas be designated?
- Is there land within the Planning Area that should be identified for retention, acquisition or sale, exchange or other disposal in order to address management objectives and issues?
- What criteria should be applied when considering acquisition from willing sellers of non-federal land to be added to the Planning Area?
- Are there public lands that are more suitable for administration by other Federal, State or local agencies?

11) How will wild horses in the HMAs be managed to maintain a sustainable, viable, healthy population and exist in a thriving, natural, ecological balance with their habitat and other multiple uses of the area?

- How do goals and objectives of the Steens Mountain CMPA affect the management of HMAs and wild horse populations?
- Should the existing AMLs for HMAs inside the Steens Mountain CMPA boundary be changed considering the following:
- reduced acreage within the HMAs,
- impacts of existing and potential fencing (inside the HMA) to implement the Act's No Livestock Grazing Area,
- potential impacts of fence removal within the HMAs,
- potential impacts of fence additions in the HMA and outside of the No Livestock Grazing Area, or
- potential impacts of less water being available to horses in the area west of the No Livestock Grazing Area?
- Should the Alvord-Tule Springs and Coyote Lakes HMAs be combined and the herds managed as one population?
- Are past decisions and current management practices regarding HMAs and Herd Areas within the Planning Area still valid?

12) How will significant cultural sites and localities be managed to ensure their protection and preservation? Where and how will interpretation be used as an education tool to increase the public's awareness and appreciation of the Planning Area's cultural resources? How will the BLM gain the scientific information forming the basis of this interpretation? How will American Indian interests, traditional religious sites, land forms and resources be considered and protected?

- How can cultural and paleontology inventories (beyond project specific clearances) be focused primarily on areas most likely to contain significant intact properties most susceptible to impacts such as erosion, livestock trampling, OHV use, artifact looting, and concentrated recreation use?
- How can sites and localities be evaluated for significance and managed as such, given time frames and constraints imposed by the needs of other resource management?
- Can all data pertaining to sites and localities continue to be successfully tracked in an automated data base?
- Can cost-share agreements with universities, research teams, undergraduate and graduate students, and the tribes continue to be implemented to gain scientific and cultural information that will form the basis for interpretation?
- Will resources, both internal and external, be available for BLM cultural personnel to gain the training and experience required to make oral and written interpretive presentations as well as to prepare design and construction of interpretative panels and facilities?
- Will active consultation with Indian tribes be ongoing and continue to establish baseline data for traditional religious sites and use areas?
- Will a Planning Area tribal use plan be developed by the BLM with cooperation of the various tribes, and would it increase coordination with tribes?

13) How are noxious weeds to be controlled and eradicated?

- Should the Burns District's Noxious Weed Management Program EA (EA OR-020-98-05) continue to be implemented in its present form or should it be evaluated and modified if necessary?
- How will management of noxious weeds in SMAs (including Wilderness) be successfully conducted within the restraints required by the guidelines and requirements of those SMAs?

- Can data in the District weed data base be successfully broken out, summarized, and utilized specific to the Planning Area?
- Can the BLM effectively increase cooperative work with other agencies to monitor locations and spread of weeds? If so, how can this be accomplished?

14) How will OHV use be managed in the Planning Area?

- What criteria will be used to determine if current and future OHV use is compatible with OHV designations in the existing BLM OHV strategy?
- What criteria will be used to determine if OHV use is causing "considerable adverse effects" to Planning Area resources?
- What changes should occur to current OHV designations if determined to be incompatible with the current BLM OHV Strategy or Planning Area objectives?

15) How will the BLM manage resource uses to improve unacceptable aquatic habitat and water quality conditions (such as stream reaches listed as Water Quality Limited (303(d)) by ODEQ) or maintain aquatic habitat and water quality that are currently in acceptable conditions?

- Do water developments/alternative water developments (reservoirs, springs) need to have application made to the state for water rights? (For smaller water developments, the lag time will be approximately seven months to gain certificate.)
- Will workload and water quality monitoring objectives need to be determined under new management priorities? As the upper Donner und Blitzen drainage area is under new management strategies, should the BLM take steps to get the tributaries and mainstream de-listed from 303(d), or should the state focus on these areas?
- To what extent will livestock management and brush control be conducted to meet fisheries habitat requirements?
- What management practices for range and woodlands accommodate fisheries habitat requirements?
- Which areas, if any, are appropriate for reintroduction of native fish species?
- What are the long-term strategies for managing fisheries?
- To what extent will the BLM adopt ODFW management objectives for fisheries?
- What management practices best address areas of biodiversity, the needs of species at the limits of their range, and species assemblages?
- How can grazing management techniques improve water quality?

16) How should the BLM manage transportation issues in the Planning Area?

- What roads and trails are needed for administrative use and/or public access?
- Where are easements or other use agreements needed to ensure future access?
- Which roads and trails should be open or closed to motorized vehicles or limited to non-motorized, non-mechanical traffic, and where?
- Which roads or trails should be seasonally closed for protection and/or improvement of resources or for public safety, and where?
- To what standards should roads and trails be maintained?
- Can roads or trails that no longer serve management purposes be abandoned and/or reclaimed?
- Should new roads or trails be considered to provide access to important public resources, prevent environmental degradation, or to improve transportation?
- What existing roads are needed to provide reasonable access to private land or areas involving other private rights or interests?
- What areas may need new roads to provide future private access?

17) Would changes in current resource uses and management practices affect the economic and social status of rural communities in the Planning Area? If so, how?

- How can public land management contribute to the economic stability of small rural communities in the Planning Area?
- How would changing land use and tourism affect traditional rural life styles?
- How would land tenure adjustments affect the economic stability of small rural communities in the Planning Area?
- How, and to what extent, will the creation of the Steens Mountain specially designated areas impact communities and residents?

These mid-scale issues generally reflect many of the broad-scale findings in the ICBEMP scientific assessment.

The group then examined the list of findings in "Using Key Broad-scale Findings in Mid-scale Issue Identification" documented in the ICBEMP Scientific Assessment (Quigley and Arbelbide 1997) and EIS. The participants determined that many of the findings applied to the Planning Area subbasin review area. Some of the findings were modified to more accurately reflect conditions within the Planning Area subbasin review. Of the approximately 60 findings or conditions listed, only 18 were considered not applicable to the Planning Area subbasin review. Either the resources did not occur in the area or conditions were known to be better than indicated in the ICBEMP findings.

The findings dealt primarily with terrestrial and aquatic habitat, water quality, riparian health, landscape health, and social and economic concerns including tribal rights. The group then developed the refined list of broad scale findings. These were discussed and small changes were made. Several findings dealt with designated priority issues including noxious weed and juniper expansion, water quality, special status species management, aquatic habitat, and riparian and wetland vegetation. Listed at the end of this chapter are those findings the group felt were not applicable to the Planning Area subbasin review. A complete description of the individual findings follows.

6.3 Revised List of Key Broad-Scale Findings Used in Issue Identification for the Andrews MU/Steens Mountain CMPA Subbasin Review Area

These findings are from *Ecosystem Review at the Subbasin Scale (Subbasin Review), Volume 1 - The Process,* August 1999, Appendix A. As stated above, some findings have been modified to more accurately reflect conditions within the Planning Area subbasin review. The ICBEMP did not address issues related to current management practices on cultural resources, including archaeological and Native American traditional values, and are therefore not addressed in this section.

6.3.1 Terrestrial Habitat/Landscape Health

6.3.1.1 Rangelands

- Noxious weeds are spreading on roadway disturbance.
- Woody species encroachment by and/or increasing density of woody species (sagebrush and juniper), especially on dry grasslands and cool shrublands, has reduced herbaceous understory and biodiversity.
- Cheatgrass has taken over many dry shrublands, increasing soil erosion and fire frequency and reducing biodiversity and wildlife habitat. Cheatgrass and other exotic plant infestations have simplified species composition, reduced biodiversity, changed species interactions and forage availability, and reduced the systems' ability to buffer against changes.
- Expansion of agricultural and urban areas on non-federal lands has reduced the extent of some rangeland potential vegetation groups, most notably dry grasslands, dry shrublands, and riparian areas. Changes in some of the remaining habitat patches and loss of native species diversity have contributed to a number of wildlife species declines, some to the point of special concern (such as sage-grouse, Columbian sharptailed grouse, California bighorn sheep, pygmy rabbit, kit fox, and Washington ground squirrel).
- Increased fragmentation and loss of connectivity within and between blocks of habitat, especially in shrub steppe and riparian areas, have isolated some habitats and populations and reduced the ability of populations to move across the landscape, resulting in long-term loss of genetic interchange.
- Slow-to-recover rangelands (in general, rangelands that receive less than 12 inches of precipitation per year) are not recovering naturally at a pace that is acceptable to the general public, and are either highly susceptible to degradation or already dominated by cheatgrass and noxious weeds.
- Fire frequency has decreased in many locations resulting in an increase in conifer encroachment; an increase in tree density in formerly savanna-like stands of juniper and ponderosa pine; and increased density and/or coverage of big sagebrush and other shrubs, with an accompanying loss of herbaceous vegetation.
- Fire frequency has increased in some areas, particularly in drier locations where exotic annual grasses have become established. Increased fire frequency has caused a loss of shrub cover and reduction in bunchgrasses.

6.3.1.2 Forests

- Interior ponderosa pine has decreased across its range with a significant decrease in old single story structure. The primary transitions were to interior Douglas fir and grand fir/white fir.
- There has been a loss of the large tree component (live and dead) within roaded and harvested areas. This decrease affects terrestrial wildlife species that are closely associated with these old forest structures.
- Western larch has decreased across its range. The primary transitions were to interior Douglas fir, lodgepole pine, or grand fir/white fir.
- Western white pine has decreased by 95 percent across its range. The primary transitions were to grand fir/white fir, western larch, and shrub/herb/tree regeneration.
- The whitebark pine/alpine larch potential vegetation type has decreased by 95 percent across its range, primarily through a transition into the whitebark pine cover type. Overall, however, the whitebark pine cover stand has also decreased, with compensating increases in Engelmann spruce/subalpine fir.
- Generally, mid-seral forest structures have increased in dry and moist forest potential vegetation groups (PVG), with a loss of large, scattered, and residual shade-intolerant tree components, and an increase in the density of smaller shade-tolerant diameter trees.
- There has been an increase in fragmentation and a loss of connectivity within and between blocks of late-seral, old forests, especially in lower elevation forests and riparian areas. This has isolated some animal habitats and populations and reduced the ability of populations to move across the landscape, resulting in a long-term loss of genetic interchange.
- Habitat for several forest carnivores and omnivores is in decline.
- Insects and diseases always existed in forests, but the size and intensity of their attacks has increased in recent years due to increased stand density.
- Dry forests have had an increase in fuel loading, duff depth, stand density, and a fuel ladder that can carry fire from the surface into the tree crowns. As a result, wildfire intensity has increased.
- Noxious weeds are spreading rapidly, and in some cases exponentially, in most dry forest types.

6.3.2 Aquatic Habitat/Landscape Health

6.3.2.1 Hydrology and Watershed Processes

- Management activities throughout watersheds in the Planning Area have affected the quantity and quality of water, processes of sedimentation and erosion, and the production and distribution of organic material, thus affecting hydrologic conditions.

6.3.2.2 Source Habitat

- Source habitats for the majority of species in the basin declined strongly (>20 percent decline) from historical to current.
- The strongest declines were for species dependent on low-elevation, old-forest habitats, species dependent on combinations of rangeland or early-seral forests with late-seral forests, and species dependent on native grassland and open canopy sagebrush habitats (Wisdom et al., in press).
- Primary causes of decline in old-forest habitats and early-seral habitats are intensive timber harvest and large-scale fir exclusion.
- Primary causes for decline in native herbland, woodland, grassland, and sagebrush habitats are excessive livestock grazing, invasion of exotic plants, and conversion of land to agriculture, residential, and urban development. Altered fire regimes have also contributed to a decline in grassland and shrubland habitats.
- A variety of road-associated factors negatively affect habitats or populations of many species.
- Human interactions with wide-ranging carnivores are generally negative and large areas of the basin may not be used by wide-ranging carnivores; because of this, habitats for many riparian dependent terrestrial species, especially shrubland habitats, have declined.
- Snag and down wood habitats in managed woodland and riparian areas have declined.

6.3.2.3 Streams, Rivers and Lakes

- Banks and beds of streams, rivers, and lakes have been altered. In general, the changes have been greatest for the larger streams, rivers, and lakes.
- Water quantity and flow rates have been locally affected.
- Many BLM administered steams are “water quality limited” as defined by the Clean Water

Act. On Forest Service-administered lands, the primary water quality problems are sedimentation, turbidity, flow alteration, and elevated temperatures. On BLM administered lands, sedimentation, turbidity, and elevated temperatures are the primary reasons for listing as water quality limited.

- Streams and rivers are highly variable across the project area, reflecting diverse physical settings and disturbance histories. Nevertheless, important aspects of fish habitat, such as pool frequency and large woody debris abundance, have decreased throughout much of the project area.

6.3.2.4 Riparian Areas and Wetlands

- The overall extent and continuity of riparian areas and wetlands has decreased.
- Riparian ecosystem function, has decreased in most subbasins within the project area.
- A majority of riparian areas on BLM administered lands are either "not meeting objectives," "non-functioning," or "functioning at risk." However, the rate has slowed and a few areas show increases in riparian cover and large trees.
- Within riparian woodlands, the abundance of mid-seral vegetation has increased, whereas the abundance of late and early seral structural stages has decreased.
- Within riparian shrublands, there has been extensive spread of western juniper and introduction of exotic grasses and forbs.
- The frequency and extent of seasonal floodplain and wetland inundation has been altered by changes in flow regime, and by changes in channel morphology.
- There is an overall decrease in large trees and late seral vegetation in riparian areas.
- Riparian areas are important for about three quarters of the terrestrial wildlife species. Wildlife numbers have declined in proportion to the decline in riparian habitat conditions.

6.3.2.5 Fish

- The composition, distribution, and status of fishes within the Planning Area are substantially different than they were historically. Some native fishes have been eliminated from large portions of their historical ranges.
- Many native nongame fish are vulnerable because of their restricted distribution or fragile or unique habitats.
- Although several of the key salmonids are still broadly distributed (notably the cutthroat trouts and redband trout), declines in abundance, loss of life history patterns, local extinctions, and fragmentation and isolation in smaller blocks of high quality habitat are apparent.
- Wild chinook salmon and steelhead are near extinction in a major part of their remaining distribution.
- Core areas for rebuilding and maintaining biological diversity associated with native fishes still exist within the basin.

6.3.3 Landscape Health

6.3.3.1 Air Quality

- The current condition of air quality in the project area is considered good, relative to other areas of the country.
- Wildland fires significantly affect the air resources. Current wildland fires produce higher levels of smoke emissions than historically. Within the project area, the current trend in prescribed fire use is expected to result in an increase of smoke emissions.

6.3.4 Social/Economic

6.3.4.1 Human Uses and Values

- The Planning Area is sparsely populated and rural, especially in areas with a large amount of agency lands.
- Development for a growing human population is encroaching on previously undeveloped areas adjacent to lands administered by the BLM. New development can put stress on the political and physical infrastructure of rural communities, diminish habitat for some wildlife, and increase agency costs to manage fire to protect people and structures.
- Recreation is an important use of agency lands in the Planning Area in terms of economic value and amount of use. Most recreation use is tied to roads and accessible water bodies, though primitive and semi-primitive recreation is also important.
- Industries customarily served by agency land uses, such as logging, wood products manufacturing and livestock grazing, no longer dictate the economic prosperity of the region, but remain economically and culturally important in rural areas. The economic dependence of communities on these

industries is highest in areas that are geographically isolated and offer few alternative employment opportunities.

- The public, including individuals and Harney County through gross receipts sharing, has invested substantial land and capital to develop road systems on agency lands, primarily to serve commodity uses.
- For those counties that have benefitted from federal sharing of gross receipts from commodity sales on agency lands, changing levels of commodity outputs can affect county budgets.
- Agency social and economic policy has emphasized the goal of supporting rural communities, specifically promoting stability in those communities deemed dependent on agency timber harvest and processing. Even-flow of timber sales, timber sale bidding methods, timber export restrictions, and small business set asides of timber sales have been the major policy tools on Forest Service-administered commercial forestlands. Regulation of grazing practices has been important on BLM administered rangelands.
- The factors that appear to help make communities resilient to economic and social change include population size and growth rate, economic diversity, social and cultural attributes, amenity setting, and quality of life. The ability of agencies to improve community resiliency depends on the effectiveness of agency land uses and management strategies to positively influence these factors.
- Predictability in timber sale volume from agency lands has been increasingly difficult to achieve. Advancing knowledge of ecosystem processes, changing societal goals, and changing forest conditions has undermined conventional assumptions underlying the quantity and regularity of timber supply from agency lands.
- Lands now administered by the BLM make up the traditional homelands of affected American Indian Tribes. Land management actions and decisions on these lands affect the rights and/or interests of these tribes and their members.
- American Indian tribes in the Basin depend on lands and resources administered by the BLM for a myriad of needs and uses ranging from subsistence uses and economic purposes to religious and cultural purposes.
- Agency social and economic policy has emphasized the goal of supporting rural communities, including tribal communities. The ability of agencies to assist tribal members and tribal communities depends on the effectiveness of agency land uses and management strategies to positively consider and influence these factors (tribal employment, subsistence, treaty/reserved rights, spiritual, cultural/social purposes).

6.3.4.2 American Indian Rights and Interests

- There is low confidence and trust that American Indian rights and interests are considered when decisions are proposed and made for actions to be taken on BLM administered lands.
- American Indian values on federal lands may be affected by proposed actions on woodlands and rangelands because of changes in vegetation structure, composition, and density; existing roads; and watershed conditions.
- Indian tribes do not feel that they are involved in the decision-making process commensurate with their legal status. They do not feel that government-to-government consultation is taking place.
- Culturally significant species such as anadromous fish and the habitat necessary to support healthy, sustainable, and harvest able populations constitute a major, but not the only, concern. American Indian people have concern for all factors that keep the ecosystem healthy.

6.4 Findings from the ICBEMP Scientific Assessment Not Applicable to the Andrew MU/Steens Mountain CMPA Subbasin Review Area

Following is a description of ICBEMP broad-scale findings determined by the BLM team to be not applicable to the subbasin review area. The reasons why the findings are not applicable are given.

Finding: Noxious weeds are spreading rapidly, and in some cases exponentially, on rangelands in every range cluster.

Response: Noxious weeds, although present on the Planning Area, are not spreading rapidly in every range cluster and the Burns BLM has implemented an integrated weed management program.

Finding: Expansion of agricultural and urban areas on non-federal lands has reduced the extent of some rangeland potential vegetation groups, most notably dry grasslands, dry shrublands, and riparian areas. Changes

in some of the remaining habitat patches and loss of native species diversity have contributed to a number of wildlife species declines, some to the point of special concern (such as sage-grouse, Columbian sharptailed grouse, California bighorn sheep, pygmy rabbit, kit fox, and Washington ground squirrel).

Response: The Planning Area has not experienced expansion of agricultural and urban areas on non-federal lands.

Finding: Increased fragmentation and loss of connectivity within and between blocks of habitat, especially in shrub steppe and riparian areas, have isolated some habitats and populations and reduced the ability of populations to move across the landscape, resulting in long-term loss of genetic interchange.

Response: There has not been fragmentation and loss of habitat connectivity in the Planning Area; in fact, the BLM has acquired parcels for incorporation into contiguous lands under BLM administration, which increases habitat connectivity.

Finding: Fire frequency has decreased in many locations resulting in an increase in conifer encroachment; an increase in tree density in formerly savanna-like stands of juniper and ponderosa pine; and increased density and/or coverage of big sagebrush and other shrubs, with an accompanying loss of herbaceous vegetation.

Response: Conifers are not readily present in the Planning Area and are not encroaching.

Finding: Interior ponderosa pine has decreased across its range with a significant decrease in old single story structure. The primary transitions were to interior Douglas fir and grand fir/white fir.

Response: Ponderosa pine has not occurred historically and does not presently occur within the Planning Area.

Finding: There has been a loss of the large tree component (live and dead) within roaded and harvested areas. This decrease affects terrestrial wildlife species that are closely associated with these old forest structures.

Response: The Planning Area is not forested; therefore, a loss of large trees has not occurred.

Finding: Western larch has decreased across its range. The primary transitions were to interior Douglas fir, lodgepole pine, or grand fir/white fir.

Response: Western larch has not occurred historically and does not presently occur within the Andrews MU/Steens Mountain CMPA subbasin review area.

Finding: Western white pine has decreased by 95 percent across its range. The primary transitions were to grand fir/white fir, western larch, and shrub/herb/tree regeneration.

Response: The Planning Area contains a very small (approximately 40 acres) stand of white fir and it has not changed substantially in size

Finding: The whitebark pine/alpine larch potential vegetation type has decreased by 95 percent across its range, primarily through a transition into the whitebark pine cover type. Overall, however, the whitebark pine cover stand has also decreased, with compensating increases in Engelmann spruce/subalpine fir.

Response: Whitebark pine/alpine larch potential vegetation type has not occurred historically and does not presently occur within the Andrews MU/Steens Mountain CMPA subbasin review area.

Finding: Generally, mid-seral forest structures have increased in dry and moist forest potential vegetation groups (PVG), with a loss of large, scattered, and residual shade-intolerant tree components, and an increase in the density of smaller shade-tolerant diameter trees.

Response: The Planning Area does not have forest habitat.

Finding: There has been an increase in fragmentation and a loss of connectivity within and between blocks of late-seral, old forests, especially in lower elevation forests and riparian areas. This has isolated some animal habitats and populations and reduced the ability of populations to move across the landscape, resulting in a long-term loss of genetic interchange.

Response: The Planning Area does not contain old-growth forests.

Finding: Habitat for several forest carnivores and omnivores is in decline.

Response: The Planning Area does not have forest habitat.

Finding: Insects and diseases always existed in forests, but the size and intensity of their attacks has increased in recent years due to increased stand density.

Response: The Planning Area does not have forest habitat.

Finding: Dry forests have had an increase in fuel loading, duff depth, stand density, and a fuel ladder that can carry fire from the surface into the tree crowns. As a result, wildfire intensity has increased.

Response: The Planning Area does not have forest habitat.

Finding: Noxious weeds are spreading rapidly, and in some cases exponentially, in most dry forest types.

Response: Noxious weeds, although present on the Planning Area, are not spreading rapidly in dry forest types and the Burns BLM has implemented an integrated weed management program.

Finding: Primary causes of decline in old-forest habitats and early-seral habitats are intensive timber harvest and large-scale fir exclusion.

Response: Old-growth forest habitat has not occurred historically and does not presently occur within the Andrews MU/Steens Mountain CMPA subbasin review area.

Finding: Human interactions with wide-ranging carnivores are generally negative and large areas of the basin may not be used by wide-ranging carnivores; because of this, habitats for many riparian dependent terrestrial species, especially shrubland habitats, have declined.

Response: Wide-Ranging carnivores are not prevalent in the Planning Area; therefore, there are no commensurate elevated levels of herbivores impacting the identified habitat.

Finding: The composition, distribution, and status of fishes within the Planning Area are substantially different than they were historically. Some native fishes have been eliminated from large portions of their historical ranges.

Response: The composition, distribution, and status of fishes within the Planning Area have not substantially changed.

Finding: Wild chinook salmon and steelhead are near extinction in a major part of their remaining distribution.

Response: Chinook salmon and steelhead do not occur in the Andrews MU/Steens Mountain CMPA subbasin review area. No anadromous fish occur in the subbasin review area since only one drainage in the subbasin review area is a tributary to the Columbia River (Wild Cat Creek), and it is an ephemeral stream.

Finding: Development for a growing human population is encroaching on previously undeveloped areas adjacent to lands administered by the Forest Service and the BLM. New development can put stress on the political and physical infrastructure of rural communities, diminish habitat for some wildlife, and increase agency costs to manage fire to protect people and structures.

Response: The Planning Area is sparsely populated and rural; however, it is not experiencing any rapid population growth. The population is stable or declining.

Finding: Agency social and economic policy has emphasized the goal of supporting rural communities, specifically promoting stability in those communities deemed dependent on agency timber harvest and processing. Even-flow of timber sales, timber sale bidding methods, timber export restrictions, and small business set asides of timber sales have been the major policy tools on Forest Service-administered commercial forestlands. Regulation of grazing practices has been important on BLM administered rangelands.

Response: The BLM does not have a social and economic policy.

Finding: Agency social and economic policy has emphasized the goal of supporting rural communities, including tribal communities. The ability of agencies to assist tribal members and tribal communities depends on the effectiveness of agency land uses and management strategies to positively consider and influence these factors (tribal employment, subsistence, treaty/reserved rights, spiritual, cultural/social purposes).

Response: The BLM does not have a social and economic policy.

Finding: Predictability in timber sale volume from agency lands has been increasingly difficult to achieve. Advancing knowledge of ecosystem processes, changing societal goals, and changing forest conditions has undermined conventional assumptions underlying the quantity and regularity of timber supply from agency lands.

Response: The Planning Area does not have forest habitat and there are no timber sales.

Finding: There is low confidence and trust that American Indian rights and interests are considered when decisions are proposed and made for actions to be taken on BLM administered lands.

Response: The Burns Paiute Tribe is the primary consultation partner for the Planning Area. The BLM has an active relationship with this tribe.

Finding: Indian tribes do not feel that they are involved in the decision-making process commensurate with their legal status. They do not feel that government-to-government consultation is taking place.

Response: The BLM has semi-annual project summary meetings and consultation on all projects in the Planning Area of interest to the tribe.

Finding: Culturally significant species such as anadromous fish and the habitat necessary to support healthy, sustainable, and harvest able populations constitute a major, but not the only, concern. American Indian people have concern for all factors that keep the ecosystem healthy.

Response: The Planning Area does not have and has not historically had anadromous fish and the habitat necessary to support healthy, sustainable, and harvest able populations of anadromous fish.

6.5 Mid-scale Character Description (Resource Area Profile)

The Description of the Mid-scale Character, Step 3 of the subbasin review process, was combined with the Resource Area Profile (RAP) of the AMS. Both the RAP and the Mid-scale Character are descriptions of the existing resources in the subbasin review area as well as their condition and use. The only difference is that the RAP covers all resources in the Planning Area, whereas the Description of the Mid-scale Character is tied to the ICBEMP findings for issue identification. Resources addressed by the findings are described for the subbasin review area as a whole. These include rangelands, woodlands, vegetation, fish and wildlife habitat, water quality, riparian habitats, and human uses and values. Those resources not addressed by the findings are described for the Andrews MU and Steens Mountain CMPA only.

Prior to the meeting of the subbasin review team, the Burns DO staff had begun to prepare mid-scale characterization, by resource, as they pertained to the mid-scale findings and issues for the subbasin review area. This was the next step in the subbasin review process. At the meeting, the group went over the draft characterizations and suggested changes and additions. The current status of each resource pertaining to the findings was described. Management concerns for the resources were identified. A listing of the concerns, by resource, is presented as the issues in Section 6.1.

These management concerns will be used in developing the Management Opportunities chapter of the AMS (Chapter 4) and will also be used in setting priorities and making recommendations as the final step in the subbasin review process. Eventually, this information will feed into the development of alternatives for the RMP/EIS.

The complete descriptions of the mid-scale character are included as Chapter 2 of this AMS.

6.6 Priorities and Recommendations (Management Opportunities)

This is Step 4 of the subbasin review process. This step is analogous to the Management Opportunities step in preparing the AMS. In both cases, management opportunities or management recommendations are identified and priority setting is begun. In the subbasin review, the priorities would set the stage for fine scale, or activity level or project planning; however, in this situation where the subbasin review and AMS are combined, the priority setting is begun at this stage, but is carried forward and refined in preparing the RMP/EIS. After that would come the fine scale planning. The Management Opportunities/Priorities and Recommendations are in Chapter 4 of the AMS document.

The group then examined the mid-scale descriptions of 22 resources of concern. The team discussed the management concerns pertaining to these resources and "brainstormed" management opportunities and recommendations to address these concerns. This set the stage for the BLM staff to identify management opportunities for all resources to be addressed in the RMP/EIS. The following is a listing of the management opportunities by resource.

6.6.1 Air Resources

Meet or exceed the National Ambient Air Quality Standards and the Prevention of Significant Deterioration with all authorized actions.

6.6.2 Energy and Mineral Resources

Provide opportunities for exploration and development of leasable energy and mineral resources while protecting other sensitive resources. Provide

opportunities for exploration and development of locatable mineral resources while protecting other sensitive resources. Provide for public demand for saleable minerals from public land while protecting sensitive resources.

6.6.3 Fire

Provide an Appropriate Management Response (AMR) on all wildland fires, with emphasis on fire fighter and public safety, minimizing suppression costs, benefits, and values to be protected, consistent with resource objectives. Recognize fire as a critical natural process and use it to protect, maintain, and enhance resources.

6.6.4 Vegetation

Restore, protect, and enhance the diversity and distribution of desirable vegetation communities, including perennial native and desirable introduced plant species. Provide for their continued existence and normal function in nutrient, water, and energy cycles. Manage big sagebrush cover in seedings and on native rangelands to meet the life history requirements of sagebrush dependent wildlife. Control the introduction and proliferation of noxious weed species and reduce the extent and density of established weed species to within acceptable limits.

6.6.5 Woodlands

Manage woodlands to maintain or restore ecosystems to a condition in which biodiversity is preserved and occurrences of fire, insects, and disease do not exceed levels normally expected in a healthy woodland. Manage woodlands for long-term healthy habitat for animal and plant species. Restore productivity and biodiversity in juniper and aspen woodland areas. Manage juniper areas where encroachment or increased density is threatening other resource values. Retain old growth characteristics in historic juniper sites not prone to frequent fire. Manage aspen to maintain diversity of age classes and to allow for species reestablishment.

6.6.6 Special Status Plant Species

Manage public land to maintain, restore, or enhance populations and habitats of special status plant species. Priority for the application of management actions would be: (1) federal endangered species, (2) federal threatened species, (3) federal proposed species, (4) federal candidate species, (5) state listed species, (6) BLM sensitive species, (7) BLM assessment species, and (8) BLM tracking species. Manage in order to conserve or lead to the recovery of threatened or endangered species.

6.6.7 Water Resources and Riparian/Wetlands

Ensure that surface water and groundwater influenced by BLM activities comply with or are making progress toward achieving State of Oregon water quality standards for beneficial uses as established per stream by the ODEQ. Restore, maintain, or improve riparian vegetation, habitat diversity, and associated watershed function to achieve healthy and productive riparian areas and wetlands. Where water rights are needed to support programs and projects within the Planning Area, they will be secured through normal channels as prescribed by state law.

6.6.8 Fish and Aquatic Habitat

Restore, maintain, or improve habitat to provide for diverse and self-sustaining communities of fishes and other aquatic organisms.

6.6.9 Wildlife and Wildlife Habitat

Maintain, restore, or enhance riparian areas and wetlands so they provide diverse and healthy habitat conditions for wildlife. Manage upland wildlife habitats to ensure that the necessary forage, water, cover, structure, and security are available on public land.

6.6.10 Special Status Animal Species

Manage public land to maintain, restore, or enhance populations and habitats of Special status animal species. Priority for the application of management actions would be: (1) federal endangered species, (2) federal threatened species, (3) federal proposed species, (4) federal candidate species, (5) state listed species, (6) BLM sensitive species, (7) BLM assessment species, and (8) BLM tracking species. Manage in order to conserve or lead to the recovery of threatened or endangered species. Facilitate the maintenance, restoration, and enhancement of bighorn sheep populations and habitat on public land. Pursue management in accordance with Oregon's Bighorn Sheep Management Plan in a manner consistent with the principles of multiple-use management.

6.6.11 Wild Horses

Maintain and manage wild horse herds in established HMAs at AMLs to ensure or enhance a thriving natural ecological balance between wild horse populations, wildlife, livestock, vegetation resources, and other resource values. Enhance and perpetuate special and unique characteristics that distinguish the respective herds.

6.6.12 Grazing Management

Grazing will be in compliance with current policy which includes the Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands in Oregon and Washington. Provide for a sustained level of livestock grazing consistent with other resource objectives and public land use allocations. Livestock grazing in the Andrews MU will be managed under laws provided by the Taylor Grazing Act, Public Rangelands Improvement Act, national Environmental Policy Act, Wilderness Act, the Act and BLM regulations. The RMP will include the Standards for Rangeland Health and Guidelines for grazing management which apply to all BLM lands in Oregon. The RMP will address several pasture and allotment boundary changes occurring as a result of land exchanges, forage offsets for creation of the No Livestock Grazing Area and grazing management changes.

6.6.13 Recreation

Provide and enhance developed and undeveloped recreation opportunities and manage the increasing demand for resource-dependent recreation activities while protecting resources.

6.6.14 Off-Highway Vehicles

Manage OHV use to protect resource values, promote public safety, provide OHV use opportunities where appropriate, and minimize conflicts among various users.

6.6.15 Visual Resources

Manage public land actions and activities in a manner consistent with VRM class objectives.

6.6.16 Areas of Critical Environmental Concern

Retain existing and designate new ACECs/RNAs where relevance and importance criteria are met and special management is required to protect the values identified.

6.6.17 Wild and Scenic Rivers

Protect and enhance ORVs of designated NWSRS and protect and enhance ORVs of rivers found suitable for WSR status until Congress acts.

6.6.18 Wilderness

Designated Wilderness Areas will be managed under the Wilderness Management Policy. The wilderness resources will be dominant whenever choices must be made between preservation of the wilderness character and visitor use.

6.6.19 Wilderness Study Areas

BLM administered land identified in the Wilderness Study Report and determined to have wilderness values could be included in adjacent WSAs and managed under the WSA IMP.

6.6.20 Human Uses and Values

Manage public land and pursue partnerships in order to provide social and economic benefits to local residents, businesses, visitors, and for future generations.

6.6.21 Cultural Resources

Protect and conserve cultural and paleontological resources. Increase the public's knowledge, appreciation, and sensitivity regarding cultural and paleontological resources. Consult and coordinate with American Indian groups to ensure that their traditional religious sites, land forms, resources, and other interests are considered.

6.6.22 Land and Realty

Retain public land with high public resource values. Consolidate public land holdings and acquire land or interests in land with high public resource values to ensure effective administration and improve resource management. Acquired land would be managed for its intended purpose. Make public land available for disposal within Zone 3 by state indemnity selection, private or state exchange, Recreation and Public Purpose Act lease or sale, public sale, or other authorized method. Establish utility and transportation system corridor routes to the extent possible, considering avoidance areas, and consistent with resource objectives.

6.7 BLM Resource Management Planning Process

During the resource management planning process, the BLM will set priorities for acting on these recommendations and opportunities. Emphasis will be placed on opportunities for protecting and managing special areas such as Areas of Critical Environmental Concern; opportunities for management of resources across administrative boundaries such as watersheds, aquatic species, and noxious weeds; and opportunities for control of juniper expansion.

Table 6.1: Steps in the Subbasin Review and Analysis of Management Situation

Subbasin Review		Analysis of the Management Situation	
Step		**Step**	
1.	Prepare for the Review	1.	Collect and Consolidate Data
2.	Identify Mid-scale Issues	2.	Conduct Internal and Public Scoping
3.	Describe Mid-scale Character (Describe character of the review area in relationship to the issues)	3.	Resource Area Profile (Describe the condition of the resource area, including its physical, biological and human environment)
	No step in subbasin review corresponds to Existing Management Situation of the AMS	4.	Existing Management Situation (Describe for each resource its current uses, production, or protection problems and the management practices and direction)
4.	Develop recommendations and integrated priority setting. (Develop recommended actions and determine urgency and timing of actions)	5.	Identify Management Opportunities (Identify and evaluate all reasonable opportunities and/or actions to address the planning issues and management concerns)
5.	Subbasin Review Report (Document the subbasin review results and the process. Provide information for further planning)	6.	Prepare the AMS (Develop a comprehensive document for use by the BLM and a summary document for public distribution. Provide information for RMP/EIS)

BLM staff incorporated the descriptions of the mid-scale character and the recommendations into the RAP and management opportunities sections, respectively, of the AMS. The similarities between the subbasin review process and the AMS process are shown in the following table. The integrated priority setting described in the subbasin review for BLM actions will be conducted through the RMP.

7 LIST OF PREPARERS

Bureau of Land Management, Burns District, Oregon - Core Team

Gary Foulkes	Project Manager, Environmental Justice, Cultural Resources, Air Quality, Socioeconomics, Auditory Resources
Rick Hall	Assistant Project Manager, ACECs, Special Status Species-Flora, Soils, Vegetation, Noxious Weeds, Woodlands/WJMA, Grazing Management
Joan Suther	Acting Steens Mountain Project Manager; Review
Mary Emerick	Wilderness, WSAs, OHVs, Fire, Minerals/Geology
Evelyn Treiman	Recreation, Wild and Scenic Rivers, Visual Resources, Transportation, Cadastral/Lands/Realty
Matt Obradovich	Wildlife, Special Status Species-Fauna, Wetlands, Animal Damage Control, Wild Horses, Riparian Areas
Darren Brumback	Fisheries, Water Resources, Riparian Areas
Kelly Hazen	GIS
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Susan Fox	Wildlife, Wild Horses, Special Status Animal Species
Matt Kiesse	Fisheries, Wild and Scenic Rivers
Julie Etra	Vegetation, Soils, Special Status Plant Species, Noxious Weeds, Riparian Areas/Wetlands
Dr. Robert Vierra	Archaeology, Native American Traditional Values

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8 PLANNING PROCESS AND PUBLIC INVOLVEMENT

8.1 BLM Planning Process

The RMP is a land use plan as described in FLPMA. The RMP establishes in a written document the following:

- Land areas for limited, restricted, or exclusive resource uses or for transfer from BLM administration;
- Allowable resource uses and related levels of production or use to be maintained;
- Resource condition goals and objectives to be reached;
- Program constraints and general management practices;
- Identification of specific activity plans required;
- Support actions required to achieve the above;
- General implementation schedule or sequences; and
- Intervals and standards for monitoring the plan to determine its effectiveness.

The underlying goal of the RMP is to provide efficient on-the-ground management of the public lands and associated resources over a period of time, usually up to 20 years. The procedure for preparing a RMP involves nine interrelated actions. These actions and the anticipated timelines for the Andrews MU/Steens Mountain CMPA RMP are outlined in Table 8.1.

8.2 Public Involvement in the Planning Process

The public involvement opportunities for the major stages of the planning process are listed below. Dates for each of these events will be publicized when finalized. Every effort will be made to ensure meaningful public involvement throughout the process, including the use of internet technology.

- Identification of Issues, Planning Criteria, and Management Concern

  Federal Register Notices of Intent, media articles, and website information regarding the preparation and content of the Plan, and schedule of upcoming scoping meeting will be readily available. E-mail messages or letters will be sent to people on the mailing list. This AMS and subbasin review will be prepared and circulated for public review prior to issuance of the Draft EIS.

  The BLM will organize and facilitate informal public open-house scoping meetings to gather public input on the issues, management concerns to be resolved in the RMP, and on the planning criteria and process. At these meetings, interested parties will have the opportunity to give written comments to the BLM as well as engage in discussion of issues. Requests for written comments on issues/scope of the RMP will be sent out during the public scoping period. Comments on the Draft and Final RMP/EIS will be solicited.

- Formulation of Alternatives/Public Interest

  Scoping meetings with interested parties and agencies will be held at several locations in order to solicit comments on alternatives and ensure that all appropriate issues are addressed. Periodic progress reports to interested parties will provide up-to-date information on the RMP/EIS process.

  Public input via written responses within the 60-day scoping/comment period will be incorporated into the process where appropriate.

  After the scoping period, flyers will be sent to all parties who have expressed interest in the Andrews MU/Steens Mountain CMPA RMP/EIS. At that time, parties can designate their level of interest in the remaining process by returning the flyer to the BLM.

- Issuance of the Draft Resource Management Plan/Environmental Impact Statement

  Public Notice of the availability of the Draft RMP/EIS, *Federal Register* Notices regarding the availability of the Draft RMP/EIS and dates for the 90-day period for public comments will be published in local/regional papers advertising the availability of the Draft RMP/EIS. The schedule of the public meetings to be held during the comment period will be published at this time.

  Public meetings will be held locally during the 90-day public comment period to gather written input on the Draft RMP/EIS.

- Issuance of Proposed Final Resource Management Plan/Environmental Impact Statement

  The Final RMP/EIS will be sent to those who commented on the Draft RMP/EIS and/or requested a copy. The availability of the Plan will be advertised in regional newspapers, *Federal Register*, and other media. A notice of a 30-day protest period will be published in all appropriate media.

  The Governor's consistency review (60 days) will run concurrently with the 30-day protest period.

- Response to Protests

  Written responses will be sent to the public as needed.

  Federal Register Notice requesting comments on significant changes made as result of a protest will be published if significant changes are warranted.

- Issuance of Approved Plan/Record of Decision

  The public will be notified via news articles, e-mail, website, and transmittal letters of the availability of the approved Plan and Records of Decisions.

8.3 Stakeholders List

Major groups of stakeholders have been identified and are listed below. Additional stakeholders will be identified throughout the process. A mailing list identifying key people in these organizations, agencies, and interest groups, as well as individuals will be compiled and maintained throughout the planning process.

Interested public
Special Interest Groups
National, state, and local agencies
Adjacent private landowners
Grazing permittees
Lien holders
Interested businesses and consultants
American Indian Tribal Governments
Search/Rescue groups
Southeast Oregon Resource Advisory Council
Steens Mountain Advisory Council
Media

Table 8.1: Anticipated Timelines for the Andrews Management Unit/Steens Mountain CMPA Resource Management Plan

PLANNING PHASE	PURPOSE	METHOD/ACTIVITY	DATES
ISSUE, PLANNING CRITERIA IDENTIFICATION	Announce upcoming scoping meetings. Request written comments on issues/scope of RMP/EIS, AMS, subbasin review.	Notice of Intent in Federal Register 30-Day Comment Period	2/02
	Develop mailing list.	Newsletter to names on RMP/EIS mailing list Press release to media	2/02
	Explain planning process to public. Solicit issues and concern. Identify scope of RMP/EIS.	Public Meetings in Burns, Frenchglen, Bend and Portland.	2/02
	Explain planning process and consistency requirements to local and state government officials. Identify agency issues and concerns.	Meet with interested groups and organizations Meet with local governments and other agencies	
	Review input from groups showing interest in RMP/EIS.	Public comment period	3/02
	Respond back to the public on issues to be addressed initially. Collect additional data where needed.	News article	
ALTERNATIVE FORMULATION	Describe alternatives that have been developed. Make sure issues are addressed. Assure focus of plan.	Newsletter to public, Plan mailing list	6/02
	Request comments on alternatives.	30-day comment period	
	Obtain comments on content.	Written responses comment period	

PLANNING PHASE	PURPOSE	METHOD/ACTIVITY	DATES
	Inform local, state, and federal agencies, interest groups' key people of alternatives.	Meetings and letters	6/02
DRAFT ARA/STEENS MTN CMPA RMP/EIS	Request comment on draft RMP/EIS. Announce upcoming public meetings.	Draft RMP/EIS mailed, 90-day comment period	5/03
		Press release to local and Portland media	
		Notice of Availability in *Federal Register*	
	Describe components of the Draft RMP/EIS and solicit comments on it.	Public Meetings in Burns, Frenchglen, Bend and Portland.	8/03
	Inform key individuals, agencies, government.	Meetings with groups, key people, government	
	Obtain comments on Draft RMP/EIS.	Written responses, 90-day comment period	8/03
PROPOSED ARA/STEENS MTN CMPA RMP/FINAL EIS	Give public opportunity to review proposed decisions and protest decisions if adversely affected.	Publish Proposed RMP/FEIS to public and mail list	12/03
		Federal Register Notice requesting comments	12/03
		Begin 60-day Governor consistency review, include notice explaining protest period (30 days)	12/03
	Opportunity to comment on any significant changes made as result of a protest.		3/04
		News release	
APPROVED PLAN/ROD	Notify public of final decisions.	News Article, Newsletter, transmittal letters	5/04
	Distribute RMP.	Mail approved RMP to RMP/EIS mailing list	
IMPLEMENTATION SCHEDULE	Document and establish RMP implementation, modification, and monitoring		9/04

Note: Dates listed are completion dates unless so stated.

9 ACRONYMS AND ABBREVIATIONS

ACEC	Area of Critical Environmental Concern
Act	Steens Mountain Cooperative Management and Protection Act of 2000
AML	Appropriate Management Level
AMP	Allotment Management Plan
AMR	Appropriate Management Response
AMS	Analysis of the Management Situation
APHIS	Agricultural Plant and Animal Health Inspection Service
AUM	Animal Unit Month
BLM	Bureau of Land Management
BMP	Best Management Practice
BPA	Bonneville Power Administration
CFR	Code of Federal Regulations
CMPA	Steens Mountain Cooperative Management and Protection Area
DO	District Office
DPS	Distinct Population Segment
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EFRU	Exclusive Farm and Range Use
ESA	Endangered Species Act of 1973, as amended
ESI	Ecological Site Inventory
ERMA	Extensive Recreation Management Area
FAR	Functioning at Risk
FEIS	Final Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
FLPMA	Federal Land Policy and Management Act
FWPCA	Federal Water Pollution Control Act of 1972
GIS	Geographic Information System
HA	Herd Area
HMA	Herd Management Area
HMP	Habitat Management Plan
HUC	Hydrologic Unit Code
ICBEMP	Interior Columbia Basin Ecosystem Management Project
ID	Interdisciplinary
IMP	Interim Management Policy
KGRA	Known Geothermic Resource Area
kV	kilovolt
MFP	Management Framework Plan
MFP	Management Framework Plan
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MU	Management Unit
NEPA	National Environmental Policy Act
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRI	Nationwide Rivers Inventory
NSO	No Surface Occupancy
OAIN	Oregon Agricultural Information Network
ODA	Oregon Department of Agriculture
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
ODSL	Oregon Division of State Lands
OHV	Off-Highway Vehicle

ONA	Outstanding Natural Area
ORS	Oregon Revised Statute
ORV	Outstandingly Remarkable Value
PM_{10}	Particulate matter less than ten micrometers in aerodynamic diameter
PFC	Proper Functioning Condition
PP&L	Pacific Power and Light
PRIA	Public Rangelands Improvement Act
PVG	Potential Vegetation Groups
RA	Resource Area
RAC	Resource Advisory Council
RAP	Resource Area Profile
RMP	Resource Management Plan
RNA	Research Natural Area
ROWs	Rights-of-Way
R&PP	Recreation and Public Purpose
RSC	Rural Service Center
RTR	Redband Trout Reserve
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SEORMP	Southeastern Oregon Resource Management Plan
SMA	Special Management Area
SMAC	Steens Mountain Advisory Council
SRMA	Special Recreation Management Area
SRP	Special Recreation Permit
TMDL	Total Maximum Daily Load
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VRM	Visual Resource Management
WAFWA	Western States Association of Fish and Wildlife Agencies
WSA	Wilderness Study Area
WSR	Wild and Scenic River
WJMA	Wildlands Juniper Management Area

10 GLOSSARY

Adaptive Management – A type of natural resource management in which decisions are made as part of an ongoing process. Adaptive management involves testing, monitoring, evaluation, and incorporating new knowledge into management approaches based on scientific findings and the needs of society. Results are used to modify management policy.

Allotment – A specific portion of public land allocated for livestock grazing, typically with identifiable or fenced boundaries and permitted for a specified number of livestock.

Allotment (grazing) – Area designated for the use of a certain number and kind of livestock for a prescribed period of time.

Allotment Management Plan (AMP) – A plan for managing livestock grazing on specified public land.

Analysis of the Management Situation (AMS)-- Step 4 of the BLM's land use planning project. It is a comprehensive documentation of the present conditions of the resources, current management guidance, and opportunities for change.

Andesite – A fine-grained igneous rock of intermediate composition composed of about equal amounts of iron and magnesium minerals and plagioclase feldspars.

Animal unit – One cow, one cow/calf pair, one horse, or five sheep.

Animal Unit Month (AUM) – The forage needed to support one cow, one cow/calf pair, one horse, or five sheep for one month. Approximately 800 pounds of forage.

Appropriate Management Level (AML) – An established population range that represents the number of animals that the designated HMA can sustain and that results in a thriving natural ecological balance with other uses and resources common to the area and avoids deterioration of the public range.

Aquifer – Rock or rock formations (often sand, gravel, sandstone, or limestone) that contain or carry groundwater and act as water reservoirs.

Area of Critical Environmental Concern (ACEC) – Area where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect humans from natural hazards.

Avoidance Areas – Areas with sensitive resource values where rights-of-way and Land Use Authorizations would be strongly discouraged. Authorizations made in avoidance areas would have to be compatible with the purpose for which the area was designated and not be otherwise feasible outside the avoidance area.

Basalt – A dark, heavy, fine-grained silica-poor igneous rock composed largely of iron and magnesium minerals and calcium-rich plagioclase feldspars.

Basin (river) – In general, the area of land that drains water, sediment, and dissolved materials to a common point along a stream channel. River basins are composed of large river systems. In this EIS, the term refers to the equivalent of a third field hydrologic unit code, an area of about nine million acres, such as the Salmon River basin. It also is used to refer in general to the Interior Columbia River Basin.

Best Management Practices (BMPs) – A set of practices which, when applied during implementation of management actions, ensures that negative impacts to natural resources are minimized. BMPs are applied based on site-specific evaluation and represent the most effective and practical means to achieve management goals for a given site.

Bureau of Land Management (BLM) – Government agency with the mandate to manage federal lands under its jurisdiction for multiple uses.

BLM assessment species– Plant and animal species on List 2 of the Oregon Natural Heritage Data Base, or those species on the Oregon List of Sensitive Wildlife Species (OAR 635-100-040) that are identified in BLM Instruction Memo OR-91-57 and are not included as federal candidate, state listed, or BLM sensitive species.

BLM sensitive species – Plant or animal species eligible for federal listed, federal candidate, state listed, or state candidate (plant) status, or on List 1 in the Oregon Natural Heritage Data Base, or approved for this category by the BLM State Director.

BLM tracking species – Plant and animal species on List 3 and 4 of the Oregon Natural Heritage Data Base, or those species on the Oregon List of Sensitive Wildlife Species (OAR 635-100-040) that are identified

in BLM Instruction Memo OR-91-57 and are not included as federal candidate, state Listed, BLM sensitive, or BLM assessment species.

Borax –An evaporite mineral ($Na_2B_4O_7$ $10H_2O$). It is the major source of boron and is generally found in alkali lake deposits. It has a variety of uses (e.g., glass and ceramics manufacturing, agricultural chemicals, chemical fluxes, fire retardant and preservative).

Broad Scale – A large regional area such as a river basin and typically a multi-state area.

Candidate Species – Any species included in the Federal Register Notice of Review that are being considered for listing as threatened or endangered by the US Fish and Wildlife Service.

Canopy – In a forest, the branches from the uppermost layer of trees; on rangeland, the vertical projection downward of the aerial portion of vegetation.

Chalcedony – A cryptocrystalline variety of quartz (SiO_2) consisting of microscopic fibers. It exhibits a myriad of colors and patterns and is used primarily as an ornamental or gemstone. Agate, jasper and thunder eggs are varieties.

Chert – A hard, very dense, fine grained sedimentary rock composed largely of microscopic quartz (SiO_2) crystals. *Chert* is synonymous with *flint.*

Classification – A process required by law for determining the suitability of public lands for certain types of disposal or lease under the public land laws or for retention in public ownership.

Clay – As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay – (geology) A rock or mineral fragment of any composition finer than 0.00016 inches in diameter. (mineral) A hydrous aluminum-silicate that occurs as microscopic plates, and commonly has the ability to absorb substantial quantities of water on the surface of the plates.

Climax vegetation – The stabilized plant community on a particular site. The plant cover reproduces itself and does not change as long as the environment remains the same.

Colluvium – Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Commodities – Goods and services produced by industries.

Community – A group of species of plants and/or animals living and interacting at a particular time and place; a group of people residing in the same place and under the same government.

Consultation – (1) An active, affirmative process that (a) identifies issues and seeks input from appropriate American Indian governments, community groups, and individuals; and (b) considers their interests as a necessary and integral part of the BLM's and Forest Service's decision-making process. (2) The Federal Government has a legal obligation to consult with American Indian Tribes. This legal obligation is based in such laws as NAGPRA, AIRFA, and numerous other Executive Orders and statutes. This legal responsibility is, through consultation, to consider Indian interests and account for those interests in the decision. (3) The term also refers to a requirement under Section 7 of the ESA for Federal agencies to consult with the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service with regard to federal actions that may affect listed threatened and endangered species or critical habitat.

Corridor (landscape) – Landscape elements that connect similar patches of habitat through an area with different characteristics. For example, streamside vegetation may create a corridor of willows and hardwoods between meadows or through a forest.

Custodial management – Management of a group of similar allotments with minimal expenditure of appropriated funds to continue protecting existing resource values.

Deep soil – A soil that is 40 to 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Developed recreation – Recreation that requires facilities which in turn result in concentrated use of an area; for example, a campground.

Diatomite – A soft, crumbly, lightweight, highly porous sedimentary rock consisting mainly of microscopic siliceous skeletons of diatoms (single-celled aquatic plants related to algae). It is used for filter aids, paint filler, abrasives, anti-caking agents, insecticide carriers, and insulation.

Dispersed recreation – Recreation that does not occur in a developed recreation life; for example, hunting or backpacking.

Disposal – Any BLM authority which transfers title out of public ownership.

Disturbance – Refers to events that alter the structure, composition, or function of terrestrial or aquatic habitats. Natural disturbances include, among others, drought, floods, wind, fires, wildlife grazing, insects, and pathogens. Human-caused disturbances include actions such as timber harvest, livestock grazing, roads, and the introduction of exotic species.

Drainage, surface – Runoff, or surface flow of water, from an area.

Duff – A generally firm organic layer on the surface of mineral soils consisting of fallen decaying plant material including everything from the litter on the surface to underlying pure humus.

Earnings – Wages and salaries, other labor income, and proprietor's income (including inventory valuation and capital consumption adjustments).

Ecological Site Inventory (ESI) – The basic inventory of present and potential vegetation on BLM rangelands. Ecological sites are differentiated on the basis of the kind, proportion, or amount of plant species.

Ecological status – The present state of vegetation of a range site in relation to the potential natural community for that site. Four classes are used to express the degree to which the production or composition of the present plant community reflects that of the potential natural community (climax):

Ecological Status (Seral stage)	Percent of Community in Climax Condition
Potential natural community	76-100
Late seral	51-75
Mid-seral	26-50
Early seral	0-25

Ecosystem – A complete, interacting system of living organisms and the land and water that make up their environment; the home places of all living things, including humans.

Ecosystem Management – The use of a "whole-landscape" approach to achieve multiple-use management of public lands by blending the needs of people and environmental values in such a way that these lands represent diverse, healthy, productive, and sustainable ecosystems.

Endangered Species – Any species defined under the ESA as being in danger of extinction throughout all or a significant portion of its range. Listings are published in the Federal Register.

Environmental Assessment (EA) – One type of document prepared by federal agencies in compliance with the National Environmental Policy Act (NEPA) which portrays the environmental consequences of proposed federal actions which are not expected to have significant impacts on the human environment.

Environmental Impact Statement (EIS) – One type of document prepared by federal agencies in compliance with the National Environmental Policy Act (NEPA) which portrays the environmental consequences of proposed major federal actions expected to have significant impacts on the human environment.

Ephemeral stream – A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no continuous supply from melting snow or other source, and its channel is above the water table at all times.

Erosion – The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (accelerated) – Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, e.g., fire that exposes the surface.

Erosion (geologic) – Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the buildup of such landscape features as flood plains and coastal plains. Erosion is synonymous with natural erosion.

Exclusion Areas – Areas with sensitive resource values where rights-of-way and land use authorizations would not be authorized.

Existing Management Situation (EMS) – Existing Management Situation; a component of the Analysis of the Management Situation; a description of the existing

management direction government resource management programs of a Planning Area.

Extensive Recreation Management Area (ERMA) – Area where recreation is unstructured and dispersed with minimal regulatory constraints and where minimal recreation-related investments are required.

Fauna – The vertebrate and invertebrate animals of an area or region.

Federal Land Policy Management Act of 1976 (FLPMA) – Law mandating that the BLM manage lands under its jurisdiction for multiple uses. Establishes guidelines for its administration; and provides for the management, protection, development, and enhancement of the public lands, among other provisions.

Feldspar – The most abundant minerals of the earth's crust. The two groups are Alkali and Plagioclase.

Fine Scale – A single landscape, such as a watershed or subwatershed.

Fine textured soil – Sandy clay, silty clay, or clay.

Fire effects – The physical, biological, and ecological impact of fire on the environment.

Fire intensity – The product of the available heat of combustion per unit area of ground and the rate of spread of the fire.

Fire Management Plan (FMP) – A strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land use plan. The plan is supplemented by operational procedures such as preparedness plans, preplanned dispatch plans, prescribed fire plans and prevention plans.

Fire regime – The characteristics of fire in a given ecosystem, such as the frequency, predictability, intensity, and seasonality of fire.

Fire return interval – The number of years between two successive fires documented in a designated area (i.e., the interval between two successive fire occurrences).

Fire suppression – All the work activities connected with fire-extinguishing operations, beginning with the discovery and continuing until the fire is completely extinguished.

Flood plain – A nearly level alluvial plain that borders a stream and is subject to inundation under flood-stage conditions unless protected artificially. It is usually a constructional landform build of sediment deposited during overflow and lateral migration of the stream.

Forage – Vegetation (both woody and non-woody) eaten by animals, especially grazing and browsing animals.

Forb – Any herbaceous plant not a grass or a grasslike species. Broad-leafed plants; includes plants that commonly are called weeds or wildflowers.

Fuel (fire) – Dry, dead parts of trees, shrubs, and other vegetation that can burn readily.

Fuels – Includes living and dead plant materials which are capable of burning.

Fuel type – An identification association of fuel elements of distinctive species, form, size, arrangement or other characteristics that will cause a predictable rate of spread or resistance to control under specific weather conditions.

Functional at Risk (FAR) - Riparian/Wetland areas that are in functional condition but an existing soil, water, or vegetation attribute makes them susceptible to degradation.

Geographic Information System (GIS) – An information processing technology to input, store, manipulate, analyze, and display data; a system of computer maps with corresponding site-specific information that can be combined electronically to provide reports and maps.

Graben – A fault-bounded down-dropped portion of the earth's crust.

Gravel – Rounded or angular fragments of rock as much as three inches (two millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravel – (Geology) Unconsolidated, rounded rock fragments greater than 0.08 inches in diameter. Sizes range from pebbles (.008-2.5 inches) to cobbles (2.5-10 inches) to boulders (greater than ten inches).

Ground water – Water that sinks into the soil and is stored in slowly flowing and slowly renewed underground reservoirs called aquifers.

Gully – A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Habitat – A place that provides seasonal or year-round food, water, shelter, and other environmental conditions for an organism, community, or population of plants or animals.

Herd – One or more wild horse bands using the same general area.

Herd Area (HA) – A geographic area identified as having provided habitat for a wild horse herd in 1971.

Herd Management Area (HMA) – A geographic area identified in a Management Framework Plan or Resource Management Plan for the long-term management of a wild horse herd.

Herd Management Area Plan – A plan that prescribes measures for the protection, management, and control of wild horses and their habitat on one or more HMAs, in conformance with decisions made in approved Management Framework or Resource Management Plans.

Horizon, soil – A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes.

Horst – A fault-bounded uplifted portion of the earth's crust.

Hydrologic – Refers to the properties, distribution, and effects of water. "Hydrology" refers to the broad science of the waters of the earth; their occurrence, circulation, distribution, chemical and physical properties, and their reaction with the environment.

Hydrologic Unit Code (HUC) – A coding system developed by the U.S. Geological Service to map geographic boundaries of watersheds of various sizes.

Hydrothermal deposit – A mineral deposit formed by hot mineral-laden fluids.

Igneous rock – Rock that solidified from a molten or semi-molten state. The major varieties include intrusive (solidified beneath the surface of the earth) and volcanic (solidified on or very near the surface of the earth).

Incident commander – Individual responsible for the management of all incident (fire) operations.

Interdisciplinary (ID) – Involving more than one discipline or resource management program. Promotes resource management at a plant community, landscape, or ecosystem level.

Interim Management Policy (IMP) – Policy for managing public lands under wilderness review. Section 603(c) of FLPMA states: "During the period of review of such areas and until Congress has determined otherwise, the Secretary shall continue to manage such lands according to his authority under this Act and other applicable law in a manner so as not to impair the suitability of such areas for preservation as wilderness, subject, however, to the continuation of existing mining and grazing uses and mineral leasing in the manner and degree in which the same was being conducted on the date of approval of this Act: Provided, that, in managing the public lands the Secretary shall by regulation or otherwise take any action required to prevent unnecessary or undue degradation of the lands and their resources or to afford environmental protection."

Intermittent stream – A stream, or reach of a stream, that flows for prolonged periods only when it receives groundwater discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Interior Columbia River Basin Ecosystem Management Project (ICBEMP) – An on-going project examining the effects (on a large, regional scale) of past and present land use activities on the Interior Columbia River Basin ecosystem and a small part of the Great Basin ecosystem.

Interior drainage – Streams with no outlet to the sea.

Issue – An opportunity, conflict, or problem about use or management of public land resources. The resolution of issues is the basis for preparing the resource management plan.

A matter of controversy, dispute, or general concern over resource management activities or land uses. To be considered a "significant" EIS issue, it must be well defined, relevant to the proposed action, and within the ability of the agency to address through alternative management strategies.

Known Geothermal Resource Area (KGRA) – "An area in which the geology, nearby discoveries, competitive interest, or other indicia would, in the

opinion of the Secretary, engender the belief in men who are experienced in the subject matter that the prospect for extraction of geothermal stream or associated geothermal resources are good enough to warrant expenditures or money for that purpose" (43 CFR 3200.0-5(k)).

Land Use Authorizations – Those realty related authorizations such as leases, permits and easements authorized under 43CFR2920 and the R&PP Act. Land use authorizations also include any other authorizations with the exception of rights-of-way (43CFR2800) and Special Recreation Permits (proposed in 43CFR2930) generally contained in 43CFR2000 series of regulations.

Leasable Minerals – Minerals that may be leased to private interests by the federal government including oil, gas, geothermal, coal, and sodium compounds.

Limestone – A sedimentary rock consisting chiefly of calcium carbonate.

Loam – Soil material that is seven to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Locatable Minerals – Minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Law of 1872, as amended. This includes deposits of gold, silver, and other uncommon minerals not subject to lease or sale.

Management Concern – Procedures or land-use allocations that do not constitute issues but which are recognized, through the RMP/EIS preparation process, as needing modification or decision regarding management direction.

Management Direction – A statement of goals and objectives, management prescriptions, and associated standards and guidelines for attaining them.

Management Framework Plan (MFP) – BLM land use plan, predecessor to the RMP. Older generation of land use plans developed by the BLM. This generation of planning has been replaced by the Resource Management Plan (RMP).

Management Opportunities – A component of the analysis of the management situation; actions or management directions that could be taken to resolve issues or management concerns.

Map unit – The basic system of description in a soil survey and delineation on a soil map. Can vary in level of detail.

Mechanical treatment – Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil - Very fine sandy loam, loam, silt loam, or silt.

Microbiotic Crust - Lichens, mosses, green algae, fungi, cyanobacteria, and bacteria growing on or just below the surface of soils.

Migration corridor – The habitat pathway an animal uses to move from one place to another.

Mineral Estate – Refers to the ownership of minerals at or beneath the surface of the land.

Mitigation – Measures designed to counteract environmental impacts or to make impacts less severe.

Monitoring – The periodic and systematic collection of resource data to measure progress toward achieving objectives.

Monitoring and Evaluation – The collection and analysis of data to evaluate the progress and effectiveness of on-the-ground actions in meeting resource management goals and objectives.

Multiple Use – Management of public land and its resources to best meet various present and future needs of the American people. This means coordinated management of resources and uses to assure the long-term health of the ecosystem.

Multiplier - A change in an economic measure resulting from a specified change in some other economic measure.

National Environmental Policy Act of 1969 (NEPA) – Law requiring all federal agencies to evaluate the impacts of proposed major federal actions with respect to their significance on the human environment.

National Wildlife Refuge (NWR) – An area administered by the U.S. Fish and Wildlife Service for the purpose of managing certain fish or wildlife species.

Naturalness (a primary wilderness value) – An area that generally appears to have been affected primarily by the forces of nature with the imprint of people's work substantially unnoticeable.

Noxious Weed – A plant specified by law as being especially undesirable, troublesome, and difficult to control. A plant species designated by federal or state law as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or nonnative, new, or not common to the United States. According to the Federal Noxious Weed Act (PL 93-639), a noxious weed is one that causes disease or has other adverse effects on man or his environment and therefore is detrimental to the agriculture and commerce of the United States and to the public health.

Nutrient, plant – Any element taken in by a plant that is essential to its growth. Plant nutrients are mainly nitrogen, phosphorous, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil, and carbon, hydrogen, and oxygen obtained from the air and water.

Objectives (management) – In this EIS, refers to indicators used to measure progress toward attainment of goals. They address short- and long-term actions taken to meet goals and the desired ranges of future conditions.

Off-Highway Vehicle (OHV) – A vehicle that can be operated off of improved and regularly maintained roads with hardened or gravel surfaces.

Organic matter – Plant and animal residue in the soil in various stages of decomposition.

Overstory - The trees in a forest that form the upper crown cover.

Perennial – A plant that lives for three or more years.

Perennial stream – A stream in which water is present during all seasons of the year.

Permeability – The quality of the soil that enables water to move downward through the profile, measured as the number of inches per hour that water moves downward through the saturated soil.

Personal income – Employee compensation plus property income.

pH value – A numerical designation of acidity and alkalinity in soil. (See Reaction, soil)

Playa Lake – A shallow lake that is seasonally dry. Soils on the lake bottom are usually quite alkaline.

Pluton – An igneous rock that crystallized deep underground.

Pluvial – Referring to a period of greater rainfall.

Pluvial Lake – A lake formed during a period of exceptionally high rainfall (e.g., a time of glacial advance during the Pleistocene epoch) and now either extinct or existing as a remnant, such as Lake Bonneville.

Point source pollution – Pollution that comes from a single identifiable source such as a smokestack, a sewer, or a pipe.

Porphyry deposit – A large, low-grade metallic mineral deposit containing disseminated sulfide minerals (e.g., copper, gold, molybdenum, or tin).

Preferred Alternative or Plan – The alternative plan, in the Draft EIS, which the agency has initially selected that best fulfills the agency's statutory mission and responsibilities and offers the most acceptable resolution of the planning issues and management concerns.

Prescribed burning – Controlled application of fire to wildland fuels in either their natural or modified state, under specified environmental conditions which allow the fire to be confined to a predetermined area and at the same time to produce the fire line intensity and rate of spread required to attain planned resource management objectives.

Prescribed fire – Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and NEPA requirements must be met prior to ignition. The introduction of fire to an area under regulated conditions for specific management purposes (usually vegetation manipulation).

Prescription – Written statement defining objectives to be attained, as well measurable criteria, which guide the selection of appropriate management actions. Prescription criteria may include safety, economic, public health, environmental, geographic, administrative, social or legal considerations under which the fire will be allowed to burn.

Primary wilderness values – The primary or key wilderness values described in the Wilderness Act by which WSAs and wildernesses are managed to protect and enhance the wilderness resource. Values include roadlessness, naturalness, solitude, primitive and unconfined recreation, and size.

Primitive and unconfined recreation (a primary wilderness value) – non-motorized and undeveloped types of outdoor recreation activities. Refers to wilderness recreation opportunities such as nature study, hiking, photography, backpacking, fishing, hunting, and other related activities. Does not include the use of motorized vehicles, bicycles, or other mechanized means of travel.

Productivity – (1) *Soil productivity*: the capacity of a soil to produce plant growth, due to the soil's chemical, physical, and biological properties (such as depth, temperature, water-holding capacity, and mineral, nutrient, and organic matter content). (2) *Vegetative productivity*: the rate of production of vegetation within a given period. (3) *General*: the innate capacity of an environment to support plant and animal life over time.

Proper Functioning Condition (PFC) – Riparian-wetland areas achieve Proper Functioning Condition when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high water flows. This thereby reduces erosion and improves water quality; filters sediment, captures bedload, and aids floodplain development; improves floodwater retention and groundwater recharge; develops root masses that stabilize streambanks again cutting action; develops diverse ponding and channel characteristics to provide habitat and water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and supports greater biodiversity. The functioning condition of riparian-wetland areas is a result of the interaction among geology, soil, water, and vegetation.

Proposed action – A proposal by a federal agency to authorize, recommend, or implement an action.

Public land – Any land or interest in land owned by the United States and administered by the Secretary of the Interior through the BLM.

Pumice – A glassy, rhyolitic rock exhibiting a vesicular, or frothy texture. It is generally used as a light weight aggregate and an abrasive.

Rangeland – Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range site – An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil – A measure of acidity or alkalinity of a soil, expressed in pH values. Soils with pH values less than 7 are acidic and those with pH greater than 7 are alkaline.

Record of Decision (ROD) – An official document in which a deciding official states the alternative that will be implemented from a prepared Final EIS.

Recreation Opportunity Spectrum (ROS) – A means of characterizing recreation opportunities in terms of setting, activity, and experience opportunities. A framework for stratifying and defining classes of outdoor recreation environment, activities, and experience opportunities. The settings, activities, and opportunities for obtaining experiences have been arranged along a continuum or spectrum divided into seven classes: Primitive, Semiprimitive, Nonmotorized, Semiprimitive Motorized, Roaded Modified, Roaded Natural, Rural, Urban.

Recreation site – An area where management actions are required to provide a specific recreation setting and activity opportunities, to protect resource values, provide public visitor safety and health, and/or to meet public recreational use demands and recreation partnership commitments. A site may or may not have permanent facilities.

Recreational river – A river or section of a river that is readily accessible by road or railroad. It may have had some development along the shorelines and may have undergone some impoundments or diversions in the past.

Regeneration – The new growth of a natural plant community, developing from seed.

Rehabilitation – The activities necessary to repair damage or disturbance caused by wildland fire or the first suppression activity.

Research Natural Area (RNA) – An area where natural processes predominate and which is preserved for research and education. Under current BLM policy, these areas must meet the relevance and importance criteria of ACECs and are designated as ACECs. An area of significant scientific interest that is designated to protect its resource values for scientific research and study.

Resource advisor – Resource specialist responsible to the incident commander for gathering and analyzing information concerning values-at-risk that may be impacted by the fire or fire suppression activities.

Resource Area – The "on-the-ground" management unit of the BLM comprised of BLM administered land within a specific geographic area.

Resource Area Profile (RAP) – A component of the analysis of the management situations; a description of the current condition, amount, location, use and demands of the natural resources in a Planning Area.

Resource Management Plan (RMP) – Current generation of land use plans developed by the BLM under the Federal Land Policy and Management Act. Replaces the older generation Management Framework Plans. Provides long-term (up to 20 years) direction for the management of a particular area of land and its resources, usually corresponding to a BLM resource area.

Revegetation – Establishing or re-establishing desirable plants on areas where desirable plants are absent or of inadequate density, by management alone (natural revegetation) or by seeding or transplanting (artificial revegetation).

Rhyolite – A fine-grained light-colored silica-rich igneous rock composed largely of potash feldspars and quartz.

Right-of-way – A permit or an easement which authorizes the use of public land for certain specified purposes, commonly for pipelines, roads, telephone lines, electric lines, reservoirs, etc; also, the reference to the land covered by such an easement or permit.

Right-of-way corridor – A parcel of land that has been identified by law, Secretarial Order, through a land use plan, or by other management decision as being the preferred location for existing and future right-of-way grants and suitable to accommodate one type of right-of-way or one or more rights-of-way which are similar, identical or compatible.

Rill – A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Riparian area – Area with distinctive soil and vegetation between a stream or other body of water and the adjacent upland; includes wetlands and those portions of floodplains and valley bottoms that support riparian vegetation.

Risk assessment – Assessing the chance of fire starting, natural or human-caused, and its potential risk to life, resources and property.

Rock fragments – Rock or mineral fragments having a diameter of two millimeters or more, e.g., pebbles, cobbles, stones, and boulders.

Runoff – The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground water runoff or seepage flow from ground water.

Saleable Minerals – High volume, low value mineral resources including common varieties of rock, clay, decorative stone, sand, gravel, and cinder.

Sand – (geology) A rock fragment or detrital particle between 0.0025 and 0.08 inches in diameter.

Scenic river – A river or section of a river that is free of impoundments and whose shorelines are largely undeveloped but accessible in places by roads.

Scoping – The process of identifying the range of consideration, issues, management concerns, preliminary alternatives, and other components of an environmental impact statement or land-use planning document. It involves both internal and external, or public, involvement.

Section 202 lands – Lands being considered for wilderness designation under Section 202 of the Federal Land Policy and Management Act of 1976.

Sediment – Soil, rock particles and organic or other debris carried from one place to another by wind, water or gravity.

Sensitive species – Species identified by a Forest Service regional forester or BLM state director for which population viability is a concern either (a) because of significant current or predicted downward trends in population numbers or density, or (b) because of significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

Seral – Refers to the sequence of transitional plant communities during succession. Early-seral refers to plants that are present soon after a disturbance or at the beginning of a new successional process (such as seedling or sapling growth stages in a forest); mid-seral in a forest would refer to pole or medium sawtimber

growth stages; late- or old-seral refers to plants present during a later stage of plant community succession (such as mature and old forest stages).

Seral stage –The developmental phase of a forest stand or rangeland with characteristic structure and plant species composition. The rated departure of a plant community from a described potential natural community (PNC) for a specific ecological site. Low-seral stage is an existing plant community which is defined as 0-25 percent comparability to the defined PNC; Mid-seral stage is an existing plant community which has 26-50 percent comparability to the PNC; Late seral stage is 51-75 percent comparable to the PNC; PNC is an existing plant community with 76-100 percent comparability to the defined PNC.

Series, soil – A nationally defined soil type set apart on distinct soil properties that affect use and management. In a soil survey, this includes a group of soils having profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shallow soil – A soil that is ten to 20 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Slope – The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Soil – A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil association – A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single soil map unit.

Soil classification – The systematic arrangement of soils into groups or categories on the basis of their characteristics.

Soil compaction – An increase in soil bulk density of 15 percent or more from the undisturbed level.

Soil complex – A map unit of two or more kinds of soils in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping.

Soil productivity – The capacity of a soil to produce a specified plant or sequence of plants under specific management.

Soil profile – A vertical section of the soil extending through all its horizons and into the parent material.

Soil survey – A field investigation resulting in a soil map showing the geographic distribution of various kinds of soil and an accompanying report that describes the soil types and interprets the findings.

Soil texture – The relative proportions of sand, silt, and clay particles in a mass of soil.

Solitude (a primary wilderness value) – The state of being alone or remote from habitations; a lonely, unfrequented, or secluded place. The intent is to evaluate the opportunity for solitude in comparison to habitations of people.

Special Recreation Management Area (SRMA) – An area where recreation is the principal management objective, where intensive recreation management is needed, and where more than minimal recreation-related investments are required.

Special Status species – Plant or animal species known or suspected to be limited in distribution, rare or uncommon within a specific area, and/or vulnerable to activities which may affect their survival. Lists of Special Status species are prepared by knowledgeable specialists through the State of Oregon; the BLM prepares a list of state sensitive species predominantly based on the list prepared biennially by the ONHP.

Stand – A community of trees occupying a specific area and sufficiently uniform in species, age, spatial arrangement and condition as to be distinguishable from trees on surrounding lands.

State Implementation Plan (SIP) – A document prepared by each state describing existing air quality conditions and measures that will be taken to attain and maintain national ambient air quality standards.

State Listed Species – Any plant or animal species listed by the State of Oregon as threatened or endangered within the state under ORS 496.004, ORS 498.026, or ORS 564.040.

Step-down – The process of applying broad-scale science findings and land use decisions to site-specific areas using a hierarchical approach (subbasin review) of understanding current resource conditions, risks, and opportunities.

Stream channel – The hollow bed where a natural stream of surface water flows or may flow; the deepest or central part of the bed, formed by the main current and covered more or less continuously by water.

Structure, soil – The arrangement of primary soil particles into compound particles or aggregates.

Subalpine – A terrestrial community that is generally found in harsher environments than the montane terrestrial community. Subalpine communities are generally colder than montane and support a unique clustering of wildlife species.

Subbasin review – An interagency collaborative consideration of resources, resource management issues, and management recommendations for one or more subbasins or watershed drainages approximately 800,000 to 1,000,000 acres in size, equivalent to a 4th-field Hydrologic Unit Code (HUC).

Subwatershed – A drainage area of approximately 20,000 acres, equivalent to a 6th-field Hydrologic Unit Code (HUC). Hierarchically, subwatersheds (6th-field HUC) are contained within a watershed (5th-field HUC), which in turn is contained within a subbasin (4th-field HUC).

Succession – A predictable process of changes in structure and composition of plant and animal communities over time. Conditions of the prior plant community or successional stage create conditions that are favorable for the establishment of the next stage. The different stages in succession are often referred to as "seral stages." (See Seral.)

Sustainability – (1) meeting the needs of the present without compromising the abilities of future generations to meet their needs; emphasizing and maintaining the underlying ecological processes that ensure long-term productivity of goods, services, and values without impairing productivity of the land. (2) In commodity production, refers to the yield of a natural resource that can be produced continually at a given intensity of management.

Sunstone – A calcium-rich variety of plagioclase feldspar that exhibits a pink to red metallic shimmer when viewed perpendicular to the surface. The shimmer is caused by light reflecting off the surface of minute parallel platelets of native copper suspended in the stone.

Supplemental wilderness values – Includes ecological (e.g., vegetation, wildlife, and overall biological/botanical processes and values associated with the natural environment), geological, scientific, educational, scenic, and historic values. When present, they can enhance primary wilderness values, but are not mandated by Congress.

Sustained yield – Maintenance of an annual or regular periodic output of a renewable resource from public land consistent with the principles of multiple use.

Talc – A very soft light green mineral ($Mg_3Si_4O_{10}(OH_2)$) found in basic igneous rocks and metamorphosed dolomites ($CaMg(CO_3)_2$). It is used in a wide variety of applications (e.g., filler, cosmetics, lubricants, and as a source of ornamental stone).

Talus – Rock fragments of any size or shape, commonly coarse and angular, derived from and lying at the base of a cliff or very steep rock slope. The accumulated mass of such loose, broken rock formed chiefly by falling, rolling, or sliding.

Terrace (geologic) – An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Terrane – A suite of similar rocks transported by crustal movements into a position where they are separated from dissimilar rocks by faults.

Terrestrial communities – Groups of cover types with similar moisture and temperature regimes, elevational gradients, structures, and used by vertebrate wildlife species.

Threatened Species – Any plant or animal species defined under the ESA as likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Listings are published in the Federal Register.

Thunderegg – An agate, opal, or chalcedony-filled nodule deposit formed in rhyolitic lavas or tuffs.

Trend – The direction of change in ecological status observed over time. Trend is described as toward or away from the potential natural community, or as not apparent.

Tuff – Volcanic ash or rock composed of compacted ash.

Upland (geology) – Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Utilization – The proportion or degree of the current year's forage production that is consumed or destroyed

by animals (including insects). Utilization may refer either to a single plant species, a group of species, or to the vegetation as a whole. Utilization is synonymous with *use*.

Values-at-risk – Any or all natural resources, improvements or other values which may be jeopardized if a fire occurs (value-at-risk, risk of resource values).

Visual Resource Management Classifications - Class I-The objective of this classification is to preserve the existing character of the landscape. This class provides for natural ecological changes and limited management activity. The level of change should be very low and must not attract attention. Class I is assigned to those areas where a management decision has been made to preserve a natural landscape.

Class II-The objective of this classification is to retain the existing character of the landscape. The level of change to landscape characteristics should be low. Management activities may be seen but should not attract the attention of a casual observer. Any changes must conform to the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape. This class represents the minimum level of VRM for WSAs.

Class III-The objective of Class III is to partially retain the existing character of the landscape. Moderate levels of change are acceptable. Management activities may attract attention but should not dominate the view of a casual observer. Changes should conform to the basic elements of the predominant natural features of the characteristic landscape.

Class IV-The objective of Class IV is to provide for management activities that require major modification of the landscape. These management activities may dominate the view and become the focus of viewer attention; however, every effort should be made to minimize the impact of these projects by carefully locating activities, minimizing disturbance, and designing the projects to conform to the characteristic landscape.

Wild River - A river or section of a river that is free of impoundments and generally inaccessible except by trail, with watersheds and shorelines essentially primitive and waters unpolluted.

Withdrawal – Withholding an area of federal land from settlement, sale, location, or entry, under some or all of the general land laws, for the purpose of limiting activities under those laws in order to maintain other public values in the area or reserving the area for a particular public purpose or program; or transferring jurisdiction over an area of federal land, other than "property" governed by the Federal Property and Administrative Services Act, as amended (40U.S.C.472) from one department, bureau, or agency to another department, bureau, or agency.

11 REFERENCES

Adams, A.W. 1975. *A Brief History of Juniper and Shrub Populations in Southern Oregon.* Resources Division, Oregon Wildlife Commission Research Report NO. 6, Pittman Robertson Project W-53-R.

Aikens, C. Melvin. 1993. *Archaeology of Oregon,* U.S. Department of the Interior, Bureau of Land Management, Portland, Oregon.

Allendorf, F.W. 1975. *Genetic Variability in a Species Possessing Extensive Gen Duplication: Genetic Interpretation of Duplicate Loci and Examination of Genetic Variation in Populations of Rainbow Trout.* Ph.D. Dissertation, University of Washington, Seattle, Washington.

Allendorf, F. and F. Utter. 1979. *Population Genetics.* Fish Physiology, Volume 8: 407-454. Academic Press, New York, New York.

Allison, I. and C. Bond. 1983. *Identity and Probably Age of Salmonids from Surface Deposits at Fossil Lake, Oregon.* Copeia. 1983, 2: 563-564.

APHIS. 1994. *Animal Damage Control. Final Environmental Impact Statement.* Three Volumes. APHIS, USDA, Washington, D.C.

Ashley, G.A.; D. English; H.K. Cordell. 1993. *Economic Effects of the Steens Mountain Recreation Lands on Local Economics (Draft).* Outdoor Recreation and Wilderness Assessment Group, Southeastern Forest Experiment Station, U.S. Department of Agriculture, Forest Service, Athens, Georgia.

Bailey, R.M. and C.E. Bond. 1963. *Four Species of Freshwater Sculpins, Genus Cottus, From Western North America*. Occasional Paper of the Museum of Zoology, University of Michigan. 634:1-27.

Bates, R.L., J.A. Jackson. 1987. *Glossary of Geology*, 3rd ed. American Geological Institute, Alexandria, Virginia. 788 pp.

Beckman, S.D. 1995. *National Register Nomination for the Birch Creek Ranch Rural Historic Landscape.* Manuscript on file at the BLM Vale District Office, Vale, Oregon.

Behnke, R.J. 1992. *Native Trout of Western North America.* American Fisheries Society Symposium 17. Bethesda, Maryland.

Benedict, E.M., approx. 1978. *Self-guided tour of Diamond Craters, Oregon's Geologic Gem*. U.S. Department of the Interior, Bureau of Land Management brochure.

Berg, R.J. .1987. *Genetic Characteristics of an Enigma: What is a Redband Trout.* Chapter 4 in Evolutionary Genetics of Rainbow of Rainbow Trout. Ph.D. Thesis. University of California, Davis, California.

Bills, F.T. 1977. *Taxonomic Status of the Isolated Populations of Tui Chub Referred to Gila bicolor oregonensis*. Master's Thesis, Oregon State University. Corvallis, Oregon.

Bond, C.E. 1974. Fishes. *Endangered Plants and Animals of Oregon*: 1. Special Report No. 205. Oregon State University Agricultural Experiment Station. Corvallis, Oregon.

Bottom, D.L.; Howell, P.J.; Rodgers, J.D. 1985. *The Effects of Stream Alterations on Salmon and Trout Habitat in Oregon*. Oregon Department of Fish and Wildlife. Portland, Oregon.

Braun, C.E., T. Britt, and R.O. Wallestad. 1977. *Guidelines for Maintenance of Sage Grouse Habitats*. Wildlife Society Bulletin 5:99-106.

Bright, Ruth McGilvra, 1979. *Prehistory and History of the Harney Area: A Cultural Resources Overview*. Manuscript on File at the Burns BLM District Office, Hines, Oregon.

Bright, R.M. 1979. *Harney Area Cultural Resources Class I Inventory: a Cultural Resources Overview.* Manuscript on file at the BLM Burns District Office, Hines, Oregon.

Brooks, Howard C., 1963. *Quicksilver in Oregon:* Oregon Department of Geology and Mineral Industries Bulletin No. 55, 223 pages and eight plates.

Buckhouse, J.C. and J.L. Mattison. 1980. *Potential Soil Erosion of Selected Habitat Types in the High Desert Region of Central Oregon*. Journal of Range Management 33:282-285.

Bunting, S.C., B.M. Kilgore, C.L. Bushey. 1987. *Guidelines for Prescribed Burning Sagebrush-Grass Rangelands in the Northern Great Basin.* U.S. Department of Agriculture, Forest Service Intermountain Research Station General Technical Report INT-231. Ogden, Utah. 33 pp.

Bureau of Land Management (BLM). Undated. *Selected Noxious Weeds of Oregon.*

____. 1969. *The National Environmental Policy Act of 1969, as amended*.

____. 1976. *The Federal Land Policy and Management Act of 1976, as amended. October 2001.*

____. 1977. *Grazing Management for Riparian-wetland Areas.* TR 1737-14. Denver, Colorado. 63 pp.

____. 1978. *Rangeland Improvement Act* (PRIA).

____. 1980. *Visual Resource Management Program*. GPO 0-302-993. Washington Office, Washington, D.C.

____. 1981. *Paleontological Sites on or near Bureau of Land Management Administered Lands in Oregon: a Preliminary Catalogue*. Oregon State Office, Portland, Oregon.

____. 1982a. *Andrews Grazing Management Program EIS*. September 1982.

____. 1985. *Steens Mountain Final Recreation Area Management Plan*. Burns District Office, Burns, Oregon.

____. 1986. *Andrews Rangeland Program Summary (May 1984) and update allotment map* (December 1986, showing about 25 allotments).

____. 1986. *Andrews Rangeland Program Summary Update*. Burns District Office, Burns, Oregon. December 1986.

____. 1987. *Supplement to the Northwest Area Noxious Weed Control Program Final Environmental Impact Statement.* Oregon State Office, Portland, Oregon.

____. 1988a. *1613 - Areas of Critical Environmental Concern*. Resource Management Planning Guidance. Washington Office, Washington, D.C. 22 pp.

____. 1988b. *The land Tenure Adjustment Plan Amendment for the Andrews and Drewsey MFPs.*

____. 1988. *National Environmental Policy Act. Handbook H-1790-1.* October 25, 1988.

____. 1989a. *Oregon Wilderness Final Environmental Impact Statement.* December 1989.

____. 1989b. *Environmental Impact Statement.* Volume III. Includes Appendices for all WSAs beginning with OR-2 plus OR-3-114. Oregon State Office, Portland, Oregon. December 1989.

____. 1989c. *Oregon Wilderness Environmental Impact Statement.* Volume I - Statewide. Oregon State Office, Portland, Oregon. December 1989.

____. 1991a. *Vegetation Treatment on BLM Lands in Thirteen Western States. Final Environmental Impact Statement.* BLM-WY-ES-91-022-4320. Wyoming State Office, Cheyenne, Wyoming.

____. 1991b. *Wilderness Study Report.* Volume I. Oregon State Office, Portland, Oregon. October 1991.

____. 1992a. *Three Rivers Resource Management Plan, Record of Decision, and Rangeland Program Summary.* Burns District Office, Hines, Oregon. September 1992.

____. 1992b. *National Wild & Scenic River Donner und Blitzen Management Plan Environmental Assessment.* Burns District Office, Hines, Oregon. June 1992.

____. 1993a. *Process for Assessing Proper Functioning Condition.* BLM Technical Reference 1737-9. Washington Office, Washington, D.C.

____. 1993b. *Donner und Blitzen National Wild and Scenic River Management Plan Environmental Assessment.* Burns District Office, Hines, Oregon. May 1993.

____. 1993c. *Andrews Plan Amendment for Recreation Access Surrounding the Steens Mountain*

Loop Road. Burns District Office, Hines, Oregon. June 1993.

____. 1994a. *A partial Inventory of Meadows on Public Land in the Pueblo Mountains (Pueblo-Lone Mountain Allotment.* Burns BLM.

____. 1994b. *The Riddle Brothers Ranch Histori Cultural Management Plan, Environmental Assessment.*

____. 1994c. *Rangeland Reform '94, Draft Environmental Impact Statement Executive Summary*.

____. 1995a. *Southeastern Oregon Resource Management Plan (SEORMP) Process and Preliminary Issues.* Vale District Office, Vale, Oregon. August 1995.

____. 1995b. *Pueblo-Lone Mountain Management Plan EA*. August 1995.

____. 1995c. *Pueblo-Lone Mountain Allotment Management Plan*. Burns District, Hines, Oregon.

____. 1995d. *Interim Management Policy for Lands under Wilderness Review H-8550-1.*

____. 1996a. *Kiger Mustang Area of Critical Concern Management Plan.*

____. 1996b. *Riddle Mountain and Kiger Wild Horse Herd Management Area Plan.*

____. 1997a. *Standards for Rangeland Health and Guidelines for Livestock Grazing Management.* August 1997.

____. 1997b. *Upper Columbia River Basin Draft Environmental Impact Statement.* Volume 1. May 1997.

____. 1998a. *Noxious Weed Management Project Environmental Assessment EA No. OR-020-98-05.* Hines, Oregon. April 16, 1998.

____. 1999. *Burns District Environmental Assessment for Commercial Day Use Activities.*

____. 2000a. *Proposed Southeast Oregon Resource Management Plan and Final Environmental Impact Statement.* Volume 1 of 3 - Text. Vale District Office, Oregon. December 2000.

____. 2000b. *Interior Columbia Basin Final Environmental Impact Statement.* December 2000.

____. 2001a. *Final Decision Record for Projects for Implementation of the Steens Mountain Cooperative Management and Protection Act of 2000 Environmental Assessment, EA-OR-027-01-27.* Burns District Office, Hines, Oregon.

____. 2001b. *Steens Mountain CMPA Interim Management Policy*. April 20, 2001.

____. 2001c. *Projects for Implementation of the Steens Mountain Cooperative Management and Protection Act of 2000 Environmental Assessment, EA-OR-027-01-27.* Burns District Office, Hines, Oregon. April 25, 2001.

____. 2001d. *Decision Record and Finding of No Significant Impact for Steens Mountain Trail Maintenance*. Burns District Office, Hines, Oregon.

____. 2001e. *Land Use Planning Handbook.* H-1601-1 Handbook. Last updated: January 5, 2001.

____. 2001f. *National Management Strategy for Motorized Off-Highway Vehicle Use on Public Lands*. Washington, D.C. January 19, 2001.

____. 2001g. *Wilderness Management.*

____. 2001h. *Wilderness Management: Final Rule*. January 16, 2001.

____. 2001. Steens Mountain in the Summer (http://www.or/blm/gov/steens/background/background_page.htm).

____. 2001. Steens Mountain Area Resources Document prepared for the Steens Mountain Advisory Council.

____. 2001. GIS Map: *Baseline PFC Map*. 2001.

____. 2001. GIS Map: *ACEC Map with Potentials*. 2001.

____. 2001. GIS Map: *Range Improvements*. 2001.

____. 2001. GIS Map: *Noxious Weeds*. 2001.

____. 2001. GIS Map: *Current Geologic Map*. 2001.

____. 2001. GIS Map: *Grazing Allotments*. 2001.

____. 2001. GIS Map: *Area Closed to Mineral Leasing Including Interim WSR Corridor*. 2001.

____. 2001. GIS Map: *Fire*. 2001.

____. 2001. GIS Map: *CMPA Top 10 Landowners Not in Exchanges Plus Pre-Exchange Owners and Acres Per Title Plat*. 2001.

____. 2001. GIS Map: *Sensitive Plants*. 2001.

____. 2001. GIS Map: *Burns District Base Map*. 2001.

____. 2001. GIS Map: *General Vegetation*. 2001.

____. 2001. GIS Map: *General Soils*. 2001.

____. 2001. GIS Map: *Fish*. 2001.

____. 2001. GIS Map: *WSAs pre- and post-act (smaller size)*. 2001.

____. 2001. GIS Map: *Steens Mountain w/Boundaries and Exchanges*. 2001.

____. 2001. GIS Map: 8.5 x 11 *Boundaries of Bureau of Land Management (BLM) RAs in Oregon*. 2001.

____. 2001. GIS Map: *Wildlife*. 2001.

____. 2001. GIS Map: *Post-Act Base Map with Exchanges*. 2001.

____. 2001. GIS Map: *New WSAs Post-Act & Exchanges*. 2001.

____. 2001. GIS Map: *Small Congressional Designations*. 2001.

____. 2001. GIS Map: *Range Condition*. 2001.

____. 2001. GIS Map: *Base Map with RNAs, ACECs, HMAs, WJMA and Recreation area*. 2001.

____. 2001. GIS Map: *Roads Closed in Wilderness*. 2001.

____. 2001. GIS Map: *Base Map Andrews/Steens*. 2001.

____. 2001. GIS Map: *Subbasins and 303(d) Listed Streams*. 2001.

____. 2001. GIS Map: *Cultural Resources*. 2001.

____. 2001. GIS Map: *Smaller Map of all WSAs and Boundaries*. 2001.

____. 2001. GIS Map: *Minerals Potential and Withdrawal Area*. 2001.

Bureau of Land Management and Oregon Department of Environmental Quality. 1990. *Memorandum of Agreement.*

Bureau of Land Management, U.S. Forest Service, and Natural Resource Conservation Service. 1998. *A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lentic Areas.* Riparian Area Management: TR 1737-15.

____. 1999. *A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas.* Riparian Area Management: TR 1737-16.

Bureau of Land Management, USFWS, USFS, ODFW, Oregon Division of State Lands. 2000. *Greater Sage-Grouse and Sagebrush-Steppe Ecosystems Management Guidelines.* August 21, 2000. Oregon State Office, Portland, Oregon BLM. 27 pp.

Campton, D.E. and J.M. Johnston. 1985. *Electrophoretic Evidence for a Genetic Admixtureof Native and NonnativeRainbow Trout in the Yakima River, Washington*. Transactions of the American Fisheries Society. 114:782-93.

Connelly, J.W. 1982. *An Ecological Study of Sage Grouse in Southeastern Idaho*. PhD. Dissertation, Washington State University, Pullman, Washington. 84 pp.Connelly, J.W. and C.E. Braun. 1997. *Long-Term Changes in Sage Grouse Centrocercus Urophasianus Populations in Western North America.* Wildlife Biology 3:123-128.

Connelly, J.W., H.W. Browers, and R.J. Gates. 1988. *Seasonal Movements of Sage Grouse in Southeastern Idaho.* Journal of Wildlife Management 52:116-122.

Crawford, J.A. and R.S. Lutz. 1985. *Sage Grouse Populations in Oregon, 1941-1983.* Murrelet 66:69-74.

Crespin, B. 1990. *The Riddle Brothers Ranch Historic District Cultural Resources Management Plan*. Manuscript on file at the BLM Burns District Office, Hines, Oregon.

Crowe, E. 1996. *Quaking Aspen and Black Cottonwood: Historical and Present-day Distribution in the Blue Mountains*. In: Natural Resources News. Blue Mountains Natural Resource Institute. January 1996.

Dambacher, J.M., K.K. Jones, and H.W. Li. 2000. *Assessment of Stream Populations and Habitat of Great Basin Redband Trout.* Completion Report Fish Research Project #99HQAG0047. Oregon Department of Fish and Wildlife, Portland, Oregon.

Dayton, William. 1960. *Notes on Western Range Forbs*. U.S. Government Printing Office, Agriculture Handbook 161.

Dennis, W.B. 1902. *A Borax Mine in Southern Oregon*: The Engineering and Mining Journal, April 26, 1902, p. 581.

Eddleman, L.E. 1987. *Establishment of Western Juniper in Central Oregon*. In: Everett, R.L. compiler. Proceedings, Pinyon Juniper Conference Reno, Nevada, January 1986. General Technical Report INT-215, 255-259 U.S. Department of Agriculture, Forest Service Intermountain Research Station, Ogden, Utah.

Eddleman, L.E. 1984. *Ecological Studies on Western Juniper in Central Oregon*. In: Oregon State University Extension Service, Proceedings, Western Juniper Management Short Course, pp. 27-35. Bend, Oregon. October 15-16.

Eddleman, L.E., P.M. Miller, and P.L. Dysart. 1994. *Western Juniper Woodlands of the Pacific Northwest, Science Assessment, Scientific Contract Report*. Interior Columbia Basin Ecosystem Management Project, Science Integration Team, Terrestrial Staff, Range Task Group.

Elmore, W. 1992. *Riparian Responses to Grazing Practices*. In: Naiman, R.G. ed., Watershed Management: Balancing Substainability and Environmental Change, pp. 443-445. Springer Verlag, New York.

Elmore, E., B. Kauffman. 1993. *Riparian and Watershed Systems: Degradation and Restoration*. Ecological Implications of Livestock Herbivores in the West, pp. 212-231.

Evans, J.G. 1994. *Geology of the Malheur, Jordan, and Andrews Resource Areas, Malheur and Harney Counties, Oregon*. In: Smith, C.L. Mineral and Energy Resources of the BLM Malheur-Jordan Resource Areas, Southeastern Oregon, A1-A43. U.S. Geological Survey.

Fausch, K.D. 1988. *Tests of Competition Between Native and Introduced Salmonids in Streams: What Have We Learned?* Canadian Journal of Fisheries and Aquatic Sciences. 45:2238-2246.

Ferns, M.L. and D.F. Huber. 1984. *Mineral Resources Map of Oregon*. Geological Map Series GMS-36, Scale 1:500,000. Oregon Department of Geology and Mineral Industries.

Ferns, M.L., H.C. Brooks, and J.G. Evans. 1993. *Geologic map of the Vale 30 X 60 Minute Quadrangle, Malheur County, Oregon and Owyhee County, Idaho*. Geological Map Series GMS-77, Scale 1:100,000. Oregon Department of Geology and Mineral Industries.

Ferns, M.L., H.C. Brooks, and J.G. Evans. 1993. *Geologic map of the Mahogany Mountain 30 X 60 Minute Quadrangle, Malheur County, Oregon and Owyhee County, Idaho*. Geological Map Series GMS-78, Scale 1:100,000. Oregon Department of Geology and Mineral Industries.

Fiero, Bill. 1986. *Geology of the Great Basin*. University of Nevada Press, Reno, Nevada. see especially pp. 6-10, 123-138.

Franklin, J.R. and C.T. Dyrness. 1973. *Natural Vegetation of Oregon and Washington*. General Technical Report PNW-8. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, Oregon.

Frewing-Runyon, L. 1995. *The Importance and Dependency of the Livestock Industry on Federal Lands in the Columbia River Basin*. Unpublished manuscript circulated April 10, 1995, for public review. U.S. Department of Agriculture, Forest Service, and U.S.

Department of the Interior, Bureau of Land Management, Interior Columbia River Basin Ecosystem Management Project, Walla Walla, Washington. 59 pp.

Frewing-Runyon, Leslie. 1999. *Environmental Justice Screening in NEPA Analysis for Oregon, Washington, and Northern California*. Oregon State Office. Portland, Oregon. March 1999. 17 pp.

Friedman, Irving and Norman Peterson. 1971. *Obsidian Hydration Dating Applied to Dating of Basaltic Volcanic Activity*: Science, vol. 172, p. 1028, June 4, 1971 and reprinted in The Ore Bin, August 1971, vol. 33, no. 8, pp. 158-159.

Ganskopp, D.C. 1984. *Habitat Use and Spatial Interactions of Cattle, Wild Horses, Mule Deer and California Bighorn Sheep in the Owyhee Breaks of Southeast Oregon.* Ph.D. Dissertation, Oregon State University, Corvallis, OR.

Gates, R.J. 1983. *Sage Grouse, Lagomorph and Pronghorn Use of a Sagebrush Grassland Burn Site on the Idaho National Engineering Laboratory*. Master's Thesis, Montana State University, Bozeman, Montana. 135 pp.

Gill, R.B. 1965. *Distribution and Abundance of a Population of Sage Grouse in North Park, Colorado.* Master's Thesis, Colorado State University, Fort Collins, Colorado.

Godwin, L.H., W.H. Lee, and S. Moore. 1980. *Lands Valuable for Geothermal Resources – Oregon, Revised.* Classification Map, scale 1:500,000. U.S. Geological Survey, Conservation Division, Western Region.

Grayson, D.K., 1993. *The Desert's Past, a Natural Prehistory of the Great Basin*. Smithsonian Institution Press, Washington and London, see especially pp. 102-111, 212-213.

Hanski, I. And M. Gilpin. 1991. *Metapopulation Dynamics: Brief History and Conceptual Domain*. Biological Journal of the Linnean Society. 42:3-16.

Hanson, M.L., W. Bowers and R. Perkins. 1993. *Lahontan Subbasins Fish Management Plan.* Oregon Department of Fish and Wildlife. Portland, Oregon.

Hemphill-Haley, Mark, 1987. *Quaternary Stratigraphy and Late Holocene Faulting along the Base of the Astern Escarpment of Steens Mountain, Southeast Oregon*: Humboldt State University Master's Thesis, 77 pp., Humboldt, California.

Hemphill-Haley, M.A., W.D. Page, R. Burke, and G.A. Carver. 1989. *Holocene Activity of the Alvord Fault, Steens Mountain, Southeast Oregon*. Woodward-Clyde Consultants, Oakland, California for U.S. Geological Survey Grant No. 14-08-0001-G1333.

House Report 101-405 (Arizona Desert Wilderness Act of 1990). Appendix A, Grazing Guidelines.

Hupp, J.W. and C.E. Braun. 1989. *Topographic Distribution of Sage Grouse Foraging in Winter.* Journal of Wildlife Management 53:823-829.

Idaho Department of Fish and Game, *W-160-R-21*, Sept. 1994.

Johnson, J.A. 1994. *Geologic Map of the Krumbo Reservoir Quadrangle, Harney County, Southeastern Oregon.* U.S. Geological Survey Miscellaneous Field Studies Map MF-2267, see especially the 11-page booklet that accompanies the map.

Johnson, D., D. Richard Lycan, J. Sweet, M. Heuhaus, and A. Schaedel. 1985. *Atlas of Oregon Lakes.* Oregon State University Press, Corvallis, Oregon.

Johnson, R., V. Litz, and K.A. Cheek. 1995. *Assessing the Economic Impacts of Outdoor Recreation in Oregon*. College of Forestry, Oregon State University, Corvallis, Oregon.

Kagan, J. and S. Caicco. 1996. *Manual of Oregon Actual Vegetation*. Oregon National Heritage Program, Portland, Oregon.

Karl, M.G. and S.G. Leonard. 1996. *Western Juniper (Juniperus Occidentalis Ssp. occidentalis) in the Interior Columbia Basin and Portions of the Klamath and Great Basin: Science Assessment.* Review Draft. Interior Columbia Basin Ecosystem Management Project, Science Integration Team, Terrestrial Staff Range Task Group. Walla Walla, Washington.

Kinch, G. 1989. *Riparian Area Management: Grazing Management in Riparian Areas.* TR 1737-4,

Bureau of Land Management. Denver, Colorado. 44 pp.

Klebenow, P.A. 1969. *Sage Grouse Nesting and Brood Habitat in Idaho*. Journal of Wildlife Management 33:649-661.

Kochert, M.N., et al. 1989. *Responses of Raptors to Livestock Grazing in the Western United States*. In: Proceedings, Western Raptor Management Symposium and Workshop. National Wildlife Federation, Washington, D.C. 320 pp.

Kunkel, C.M. 1976. *Biology and Production of the Redband Trout in Four Southeastern Oregon Streams*. Master's Thesis, Oregon State University, Corvallis, Oregon.

Leckenby, D.A., A.W. Adams, and R.W. Roberts. 1971. *Mule Deer Winter Range Ecology and Management*. Oregon State Game Commission. Pittman Robertson Project Report W-70-R-1.

Li, H.W., G.A. Lamberti, T. Pearsons, C.Tait, J. Li and J. Buckhouse. 1994. *Cumulative Effects of Riparian Distribution along High Desert Trout Streams of the John Day Basin, Oregon.* Transactions of the American Fisheries Society.

Libbey, F.W. 1960. *Boron in Alvord Valley, Harney County, Oregon*. The Ore Bin, vol. 22, no. 10, pp. 97-105.

Logan, B. and B. Clinch. 1991. *Montana Forestry BMPs*. Montana Department of State Lands, Missoula, Montana.

Mackie, R.J. 1970. *Range Ecology and Relationships of Mule Deer, Elk, and Cattle in the Missouri River Breaks, Montana.* Wildlife Monogram 20. 79 pp.

Mansfield, Donald H. 1995. *Vascular Flora of Steens Mountain, Oregon*. Journal of the Idaho Academy of Science. Vol. 31 - No. 2. December, 1995.

Markle, D.F. and D.L. Hill, Jr. 2000. *Taxonomy and Distribution of the Malheur Mottled Sculpin, Cottus benderei*. Northwest Science 74(3):202-211.

Martin, Robert E. 1982. *Fire History and Its Role in Succession*.

McDonald, F. 1994. *The Riddle Brothers Ranch Historic District Cultural Resources Management Plan, Environmental Assessment.* Manuscript on file at the BLM Burns District Office, Hines, Oregon.

Meehan, W.R., ed. 1991. *Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats*. Special Publication 19. Bethesda, MD: American Fisheries Society. 751 pp.

Meeuwig, R.O. 1970. *Sheet Erosion on Intermountain Summer Ranges*. U.S. Department of Agriculture, Forest Service, Research Paper INT-85.

Miller, R.F. and Weigan, P.E. 1994. *Holocene Changes in Semiarid Pinyon-juniper Woodlands*. Bioscience 44:465-474.

Miller, R.F., T. Svejcar, M. Willis, and L. Eddleman. 1996. *History, Ecology and Management of Western Juniper Woodlands and Associated Shrublands: an Annual Report of Preliminary Results and Progress for 1995.* Eastern Oregon Agricultural Research Center. 33 pp.

Miller, R.F. and J.A. Rose. 1998. *Fire History and Juniperus Occidentalis Hook. Encroachment in Artemesia Steppe*. American Midland Naturalist. In submission.

Miller, R.F. and J.A. Rose. *1995. Historical Expansion of Juniperus occidentalis (western juniper) in Southeastern Oregon*. Great Basin Naturalist 55:37-45.

Minor, S.A., J.J. Rytuba, J.J. Grubensky, D.B. Vander Meulen, C.A. Goeldner and K.J. Tegtmeyer. 1987. *Geologic Map of the High Steens and Little Blitzen Gorge Wilderness Study Areas, Harney County, Oregon*. U.S. Geological Survey, Miscellaneous Field Studies Map MF-1876.

Minor, S.A., Donald Plouff, L.E. Esparza, and T.J. Peters. 1987. *Mineral Resources of the High Steens and Little Blitzen Gorge Wilderness Study Areas, Harney County, Oregon*. U.S. Geological Survey Bulletin 1740-A. 21 pp.

Moskowitz, D. and G. Rahr. 1994. *Native Trout Report: an Analysis of the Status and Management of Oregon's NativeTrout with Management Recommendations for Conservation*. Native Trout Conservation Council. Portland, Oregon.

Myers, L.H. 1989. *Grazing and Riparian Management in Southwestern Montana*. pp. 117-120 In: Gresswell R.E., Barton, B.A., and Kerschner, J.L., eds. Practical Approaches to Riparian Resource Management: an Educational Workshop. Bureau of Land Management, Billings, Montana.

National Park Service, USDA Forest Service, Bureau of Indian Affairs, U.S. Fish and Wildlife Service, and Bureau of LandManagement. 1998 *Wildland and Prescribed Fire Management Policy; Implementation Procedures Reference Guide*. National Interagency Fire Center. Boise, Idaho.

Nussbaum. R.A., E.E. Brodie, Jr. and R.M. Stor. 1983. *Amphibians and Reptiles of the Pacific Northwest*. University of Idaho Press, Moscow. 332 pp.

Oregon Agricultural Information Network (OAIN). 2000.

Oregon Department of Agriculture. 1997. *Noxious Weed Policy and Classification System*. Oregon Department of Agriculture. Salem, Oregon.

Oregon Department of Environmental Quality. *Water Quality Limited Streams Database*.

____. 1988. *Oregon Statewide Assessment of Nonpoint Sources of Water Pollution*. Planning and Monitoring Section, Water Quality Division, Oregon Department of Environmental Quality, Portland, Oregon.

Oregon Department of Fish and Wildlife.1990. *Mule Deer Plan.*

____. 1992-1997. *Oregon's Bighorn Sheep Management Plan*. 1992-1997. Portland, Oregon..

____. 1992. *Oregon's Elk Management* Plan. July 1992. Portland, Oregon.

____. 1993. *Oregon Cougar Management Plan. Public Review Draft*. Proposed for Adoption, March 1993.

____. 1997. *Oregon Department of Fish and Wildlife Sensitive Species*. December 1997.

____. 1997. *Catlow Redband Trout and Catlow Tui Chub Conservation Agreement and Strategy.*

____. 1999. *Conservation Status of Oregon Basin Redband Trout.* Public Review Draft 4-12-99.

Oregon Economic and Community Development Department. 2001. *Economic Data*. State of Oregon, Salem, Oregon.

____. Oregon Resident Labor Force, Unemployment and Employment Tables, Various Years. Portland, Oregon.

Oregon Natural Heritage Advisory Council. 1995. *Rare, Threatened and Endangered Plants and Animals of Oregon.* Oregon Natural Heritage Program, Portland, Oregon. 84 pp.

____. 1998. *Rare, Threatened and Endangered Species of Oregon.* March, 1998.

____. 1998a. *Oregon Natural Heritage Plan*. Natural Heritage Advisory Council to the State Land Board, Salem, Oregon. 137 pp.

Oregon Parks and Recreation Department. 2000. *SE Oregon Recreation Plan for Harney, Lake and Malheur Counties.*

____. 1994. Oregon Outdoor Recreation Plan 1994-1999. Portland, Oregon.

Oregon State University Extension Economic Information Office. 2000. *2000 Oregon County and State Agricultural Estimates*. Oregon State University, Corvallis, Oregon.

Oregon Tourism Commission. 2001. *Oregon Travel Impacts 1991-2000 Detailed County Estimates.*

Orr, E.L., W.N. Orr, and E.M. Baldwin. 1992. *Geology of Oregon*, 4th ed. Kendall/Hunt Publishing, Dubuque, Iowa. 254 pp.

Peters, S.G., G. Albino, H.C. Brooks, J.G. Evans, R.R. Carlson, G.H. Lee, A. Griscom, and P.F. Halvorson. 1994. *Economic Geology: Deposit*

Models and Tracts for Undiscovered Metallic Resources in the Malheur-Jordan-Andrews Resource Areas, Southern Oregon. In: Cole, S.L., ed. Energy and Mineral Resources of the BLM Malheur-Jordan Resource Areas, Southeastern Oregon. Administrative report B1-B19, U.S. Geological Survey.

Proceedings, BLM Workshop: *"The Ecology and Management of Microbiotic Soil Crusts in the Great Basin and Snake River Plain"* Oct. 29-30, 1996. Boise, Idaho.

Puchy, Claire A. and David B. Marshall. 1993. *Oregon Wildlife Diversity Plan*, 2nd ed. Oregon Department of Fish and Wildlife, Portland, Oregon.

Quigley, Thomas M., Richard W. Haynes, and Russell T. Graham, tech. eds. September 1996. *Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin and Portions of the Klamath and Great Basins.* PNW-GTR-385. USDA, Forest Service, Pacific Northwest Research Station.

Quigley, Thomas M., and S.J. Arbelbide Jr., tech. eds. 1997. *An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins.* Gen. Tech. Rep. PNW-GTR-504. Four vols. USDA, Forest Service, Pacific Northwest Research Station.

Rangeland Form '94 *Draft EIS Executive Summary*.

Reed-Jerofke, Linda. 1999. Personal Communication.

Reformatted Comprehensive Plan for the City of Burns, Oregon. August, 1977.

Reyna, N. 1998. *Economic and Social Conditions of Communities: Economic and Social Characteristics of Interior Columbia Basin Communities and an Estimation of Effects on Communities from the Alternatives of the Eastside and Upper Columbia River Basin Draft Environmental Impact Statements.*

Reisenbichler, R.R. 1977. *Effects of Artificial Propogation of Anadromous Salmonids on Wild Populations.* In Hassler, T.J. and R.R. Vankirk, eds., Genetic Implications of Steelhead Management. Special Report 77-1. California Cooperative Fishery Research Unit:2-3. Arcata, California.

Rieman, B., D. Lee., J. McIntyre [and others]. 1993 *Consideration of Extinction Risks for Salmonids.* Fish Habitat Relationships Technical Bulletin Number 14. U.S. Department of Agriculture, Forest Service. Eureka, California.

Roberts, B.C. 1995. *Best Management Practices of Erosion and Sediment Control.*

Roché, C. and L.C. Burrill. 1992. *Squarrose Knapweed*. Pacific Northwest Extension Publication PNW 422. Corvallis, Oregon. Two pp.

Roche', B.F., C.T. Roche', R.C. Chapman. 1994. *Impacts of Grassland Habitat on Yellow Starthistle (Centarua solstitialis) Invasion*. Northwest Science 68(2):86-96.

Schlosser, I.J. 1982. *Trophic Structure, Reproductive Success and Growth Rate of Fishes in a Natural and Modified Headwater Stream.* Canadian Journal of Fisheries and Aquatic Sciences. 39:968-978.

Scott, W.B. and E.J. Crossman. 1973. *Freshwater Fishes of Canada*. Bulletin 184, Fisheries Research Board of Canada. Ottawa, Canada.

Severson, K.E. and J.N. Rinne. 1988. *Increasing Habitat Diversity in Southwestern Forests and Woodlands via Prescribed Fire*.

Smith, Cole L., ed. *Mineral and Energy Resources of the BLM Malheur-Jordan-Andrews Resource Areas, Southeastern Oregon*: U.S. Geological Survey administrative report to the BLM for the Southeast Oregon Resource Management Plan that will be published as a U.S.G.S. professional paper in approximately 2002.

St. Clair, L. and J. Johansen. 1993. *Introduction to the Symposium on Soil Crust Communities*. Great Basin Naturalist. Vol. 53.

State of Oregon, Department of Forestry. *Various Annual Reports, 1985-1998.* Oregon Timber Harvest Report. Salem, Oregon. One p.

Stearley, R.F. and G.R. Smith. 1983. *Phylogeny of the Pacific Trouts and Salmons (Oncorhynchus) and genera of theFamily Salmonidae.*

Transactions of the American Fisheries Society. 122:1-33.

Tait, C.K., J. Li, G. Lamberti, T. Pearsons and H. Li. 1994. *Relationships between Riparian Cover and the Community Structure of High Desert Streams*. Journal of the North American Benthological Society. 13: 45-56.

Thomas, J.W. et al. *Wildlife Habitats in Managed Rangelands - The Great Basin of Southeastern Oregon.*

Thurwo, R. 1988. *Wood River Fisheries Investigations.* Job Performance Report. Project F-73-R-10. Idaho Department of Fish and Game. Boise, Idaho.

Trainer, C.E., J. Lemos, T.P. Kistner, W.C. Lightfoot, and D.E. Toweil. 1981. *Mortality of Mule Deer Fawns in Southeastern Oregon, 1968-1979.* Oregon Department of Fish and Wildlife Research Report 10. 113 pp.

U.S. Department of Commerce. 2000. *2000 Census of Population and Housing.* U.S. Census Bureau.

U.S. Department of Transportation Report. 1994. *No. FHWA-FLP-94-005*. National Technical Information Service, Springfield, Virginia.

U.S. Geological Survey. 1995. U.S. *Geological Survey Water Data Report OR-95-1, Water Resources Data, Oregon, Water Year 1995*. Water Resources Division, Portland, Oregon.

U.S. Fish and Wildlife Service (USFWS). Undated. *Catlow Redband Trout and Catlow Tui Chub Conservation Agreement and Strategy.*

____. 1982.*Pacific Coast American Peregrine Falcon Recovery Team.*

____. 1986. *Recovery Plan for the Pacific Bald Eagle.*

____. 1991. *Endangered and Threatened Wildlife and Plants*. 50 CFR 17.11. GPO, Washington, D.C.

____. 1991. *Endangered and Threatened Wildlife and Plants; Animal Candidate Review for Listing as Endangered or Threatened Species, Proposed Rules*. Federal Register, 56 (115):58804-58836.

____. 1997. *Recovery Plan for the Borax Lake Chub, Gila boraxobius*. Portland, Oregon. February 4, 1997.

____. 2000. *Status Review for Great Basin Redband Trout.* Portland, Oregon. February 2000.

U.S. Forest Service (USFS). 1996. *Status of the Interior Columbia Basin, Summary of Scientific Findings*. U.S. Department of Agriculture, Forest Service General Technical Report PNW-GTR-385, Portland, Oregon. 144 pp.

U.S. Forest Service and BLM. 1997. *Interior Columbia Basin Ecosystem Management Project Eastside Draft Environmental Impact Statement.* Walla Walla, Washington.

____. 1996. *Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin*.

Vavra, L.A. and F.A. Sneva. 1978. *Diets of Grazing Animals Using Common Range in Eastern Oregon.*.

Volland, L.A. and J.D. Dell. 1981. *Fire Effects on Pacific Northwest Forest and Range Vegetation.* U.S. Department of Agriculture, Forest Service, Pacific Norwest Region Rangeland Management/Aviation and Fire Management Report. R6 RM 067. Portland, Oregon. 23 pp.

Walker, G.W. and N.S. MacLeod. 1991. *Geologic Map of Oregon, scale 1:500,000.* U.S. Geological Survey. Portland, Oregon.

Wallace, R.L. 1981. *Morphological Study of Native trout Populations of Owyhee County, Idaho.* Final Report Contract ID-010-DT0-002. Department of the Interior, Bureau of Land Management. Boise, Idaho. 49 pp.

Wallestad, R.O. and D.B. Pyrah. 1974. *Movement and Nesting of Sage Grouse Hens in Central Montana*. Journal of Wildlife Management 38:630-633.

Wayland, R.G. and W.H. Lee. 1980. *Lands Valuable for Sodium and Potassium – Oregon, Revised.* Map scale 1:500,000. U.S. Geological Survey, Conservation Division, Western Region. Portland, Oregon.

Weissenborn, ed. 1969. *Mineral and Water Resources of Oregon*: Oregon Department of Geology and Mineral Industries Bulletin 64. see especially pp. 157 and 184.

West, N.E. 1984. *Successional Patterns and Productivity Potentials of Pinyon-juniper Ecosystems*. In: Developing strategies for rangeland management. National Research Council/National Academy of Sciences, 1301-1332. Westview Press, Boulder, Colorado.

Williams, Howel, and Robert R. Compton. 1953. *Quicksilver Deposits of Steens Mountain and Pueblo Mountains, Southeast Oregon*: U.S. Geological Survey Bulletin 995-B, 76 pages and three plates.

Williams, J.E. and C.E. Bond. 1983. *Status and Life History Notes on the Native Fishes of the Alvord Basin, Oregon and Nevada.* Great Basin Naturalist. 43(3):409-420.

Williams, J.E., J.E. Johnson, D.A Hendrickson [and others]. 1989. *Fishes of North America Endangered, Threatened or of Special Concern*. American Fisheries Society. Bethesda, Maryland. 14(6): 2-20.

Williams, J.E. 1995. *Threatened Fish of the World: Gila boraxobius Williams and Bond, 1980 (Cyprinidae).* Environmental Biology of Fishes. 43: 294.

Williams, R.N. 1991. *Genetic Analysis and Taxonomic Status of Cutthroat Trout from Willow Creek and Whitehorse Creek in Southeastern Oregon.* Evolutionary genetics Lab Report 91-3. Boise State University. Boise, Idaho.

Williams, T.R. and M.S. Bedinger. 1984. *Selected Geologic and Hydrologic Characteristics of the Basin and Range Province, Western United States, Pleistocene Lakes and Marshes*: U.S. Geological Survey Miscellaneous Investigations Series Map I-1522-D, scale 1:2,500,000.

Willis, M.J. 1993. *Sage Grouse in Oregon*. Oregon Department of Fish and Wildlife Research Report No. 15. 54 pp.

Wright, H.A. and C.M. Britton. 1976. *Fire Effects on Vegetation in Western Rangeland Communities.*

Zoellick, B. 1995. *Summer Water Temperatures and the Distribution of Redband Trout in Four Streams in the Owyhee Mountains.* Unpublished information presented at Idaho Chapter Annual Meeting of American Fisheries Society. Boise, Idaho.

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